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Future



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Win / Mac



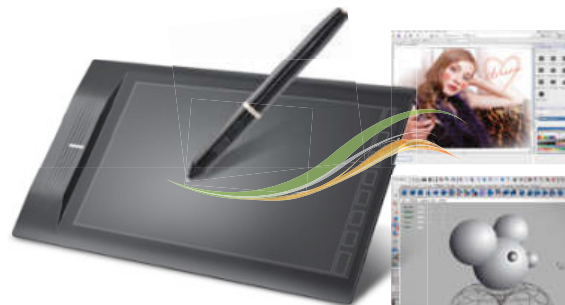
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iOS / Android / Win



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Win / Mac

EDITORIAL

UNFETTERED SPECULATION



[VANILLA IS MY FAVOURITE]

Why we still need the Nexus

TECHLIFE'S EDITOR WEIGHS IN ON WHETHER GOOGLE'S NEXUS DEVICES ARE STILL A GOOD IDEA, OR WHETHER THEY'RE ACTUALLY UNDERMINING OTHER ANDROID HARDWARE MAKERS.

[DAN GARDINER]

GOOGLE RECENTLY ANNOUNCED the latest refresh of its Nexus smartphones — this year we're getting a 5.2-inch model (the 5X) made by LG and a 5.7-inch unit (the 6P) from Chinese vendor Huawei. Australian pricing and release dates were still TBD as we went to print, but expect them to be pricier than their predecessors, as the Aussie dollar has taken a pummeling over the last year.

Now, there've been arguments against Nexus devices since they first debuted, and the announcement of these new models has some commentators again suggesting that they're no longer necessary and that, rather than providing an aspirational pointer for other Android makers to emulate, they're just middling devices that further muddy an already-overcrowded Android market.

From a hardware perspective, that argument makes some sense. The new Nexuses don't really break any ground in terms of flagship hardware features or even what's under the hood. And even considering the software side of Android, vendor versions of the OS have certainly improved. Even Samsung's tuned up its notoriously clunky TouchWiz interface to the point where there's really very little to complain about.

But that said, there's one spot that continues to be an open, weeping wound in the side of what is an otherwise healthy and vibrant smartphone platform: OS updates, or lack thereof. The current situation with Android is only marginally better than when Nexus devices were first introduced: there are no guarantees.

This isn't just about getting the latest glitzy OS features either. As 2015 has shown, security on both Android and iOS is by no means bulletproof, so being able to roll out patches for vulnerabilities quickly is something every vendor should aspire to.

And in that department, Apple's set the bar very high. Buy an iPhone and you're guaranteed major OS updates and important security patches for at least 3 years.

Buy on Android and you'll get no such assurance.

Some vendors are admittedly better at this than others. Sony and Motorola deliberately keep their builds of Android close to stock to make it simple to roll out updates in a timely fashion. But with Samsung, who sells many more Android phones than any other company, unless you're on a flagship device that's less than a couple of months old, you'll be lucky to see a major OS update within 3 months of Google releasing it.

Device makers aren't entirely at fault for this delay — carriers often hold things up with internal testing too, adding weeks or months to the process. But given that all iPhone owners get major iOS updates on the same day, the reasons for Android delays don't hold as much water. Of course, the Nexus program mostly works the same way — which shows that it can be done on Android, too. And as long as that remains the case, there'll still be a strong argument for Google to make Nexus gear. ■



WELCOME
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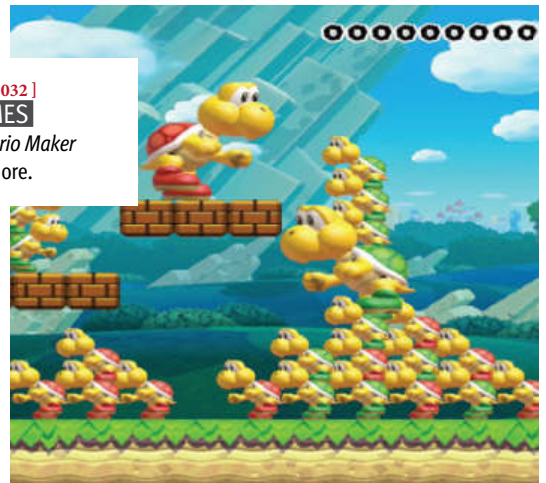
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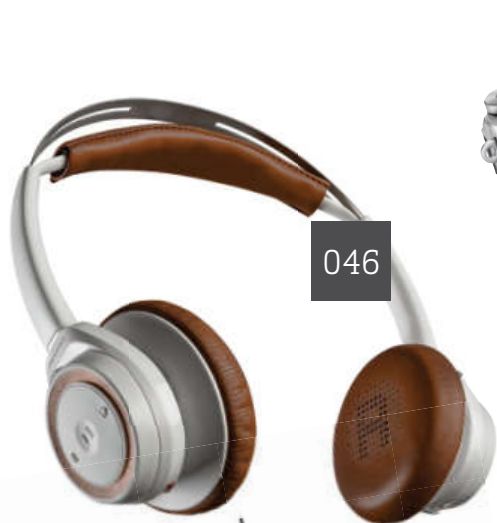
**TESTED: NEW PCs,
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GAMES

Forza 6, Mario Maker
and more.





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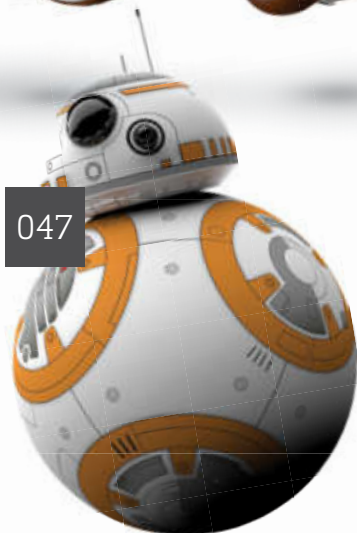


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The best tech products

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ASHAMPOO SLIDESHOW STUDIO 2015, 5 GREAT SAFETY TOOLS FOR WINDOWS & 5 ESSENTIAL MEDIA APPS



01

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TOOLKIT #2: 5 ESSENTIAL MEDIA APPS

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AUDIOGRABBER

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Head to www.techlife.net/exclusives to download the apps from this toolkit.

TECHlife

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THE WALL

GUFF AND STUFF

[COME ON, HAVE YOUR SAY!]

We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to techlife@futurenet.com. All correspondence becomes the property of *TechLife* and is subject to editing. Letters must include full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.

The latest Roku media players support 5GHz Wi-Fi, but aren't commonly available in Australia.



Where are the 5GHz media streamers?

I currently use the WD TV Live, what is frustrating with this product is that it operates at the 2.4 GHz band and doesn't recognise the 5GHz band, which is effectively ignoring the advantages of routers such as the ASUS RT-AC87U.

Is there a streaming device that TechLife could recommend as an alternative that takes advantage of the 5GHz band for use people attempting to stream HD.

[GREG JOHNSON]

Ed replies: In Australia, there don't seem to be any players that are both as polished and friendly as the WD TV Live and that also support 5GHz Wi-Fi. If you're willing to take a slight leap, we'd suggest jumping on Amazon and buying a Roku 2 or Roku 3, which start at US\$70 do support 5GHz. The caveat is that they come with US power adapters, so you'll need an adapter plug to use them. And being from the States, they won't hook into any local Aussie streaming services, obviously.



Windows 10 driver woes

I have a desktop with a Nvidia 250GT graphics card which doesn't work with the latest driver. I recently upgraded to Windows 10. After upgrading Windows automatically tried to upgrade the display driver resulting in the computer crashing. It could only be restarted in

Safe mode. After rolling back the driver and restarting, the driver is again automatically updated and the computer crashes.

I have tried using the Windows 10 downloadable tool that can block updates and drivers to hide the driver update but the driver still appears in the list of updates and tries to install itself. I have also set 'Device Installation Settings' to 'Never install driver software from Windows Update'. The only way to prevent this driver update is to set update to 'Notify Schedule Restart'. But by doing this no updates are installed.

Is there any way I can prevent Windows trying to update this driver?

[CARL FRANCIS]

Ed replies: It sounds like you've tried every method available through Windows Carl (barring turning off Windows Update completely, which we wouldn't recommend), but we've noticed that Nvidia seems to offer two Windows 10 drivers for your graphics card (as in the screenshot below), one slightly older which may work if the latest doesn't. It could be time to seek the wisdom of the crowd on this one too: have any other TechLife readers experienced and overcome similar driver problems in Windows 10? ■



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CRITICAL SPECS

iOS 9.0.2, 5.5-inch IPS LCD screen @ 1080p, dual-core 1.84GHz Apple A9 CPU, 2GB RAM, 16/64/128GB storage, 12MP rear and 5MP front-facing cameras, , capacitive fingerprint sensor, 3D Touch, 802.11b/g/n/ac Wi-Fi, 192g.

[PUSH IT GOOD]

Apple adds another dimension

THE SMARTPHONE KING'S NEW IPHONES INCLUDE A NEW WAY TO INTERACT WITH YOUR DEVICE. IS THAT ENOUGH TO MAKE THEM WORTH AN UPGRADE?

[DAN GARDINER]

DESPITE BEING AN off 'S' year for iPhones, Apple is calling the 6S and 6S Plus 'all-new' — and it's not actually gilding the lily. There's the requisite new CPU and GPU, of course, alongside double the RAM, but despite looking basically identical to last year's iPhones, even the chassis on these new models has been redesigned. There's a couple of reasons for that. The first is to squeeze in the 3D Touch electronics, which makes the whole display pressure-sensitive but required the addition of a couple of new layers to the screen assembly.

Apple's also increased overall chassis strength — it clearly wants to avoid a repeat of last year's iPhone 6 Plus 'bendgate' shenanigans — and it's now proudly trumpeting the use of aerospace-grade aluminium. This new metal's actually changed the look of the chassis ever so slightly; it's more matte in appearance and less sparkly, but also feels a bit grippier in the hand.

Those new additions haven't come without a cost, however, with the new iPhones around 10% heavier, taking the standard 6 from 129g to 143g and the Plus from 171g to 192g. The

batteries are both a tad smaller too — about 6%.

STEPPING UP

Still, there's no denying those upgrades make these new phones speedy numbers. While some Android devices, like the Note 5, do deliver faster general processing (by around 10%), the iPhones are absolutely rippers when it comes to gaming, doubling the performance of last year's models and outpacing the aforementioned Note 5 by between 30-40% in some benchmarks.

In everyday use, that means you get a super-smooth OS and less waiting time for things that require loading — like games. Still, there's not a massive difference compared to a 6 or 6 Plus — it's only really on moving back to an older device that you really notice any change.

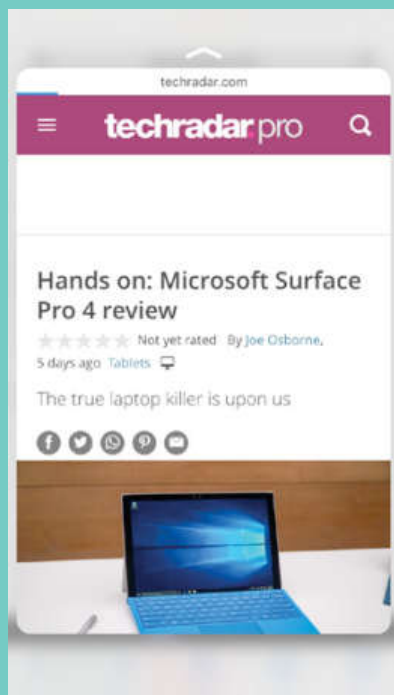
THAT EXTRA DIMENSION

3D Touch is undoubtedly the most interesting new feature, taking screen interaction beyond just up/down and left/right with the addition of in and out. And that's pressure-sensitive in/out too, meaning actions can change depending on

how 'deeply' you press. Apple's sprinkled 3D Touch functionality into some areas of the OS and liberally throughout its own apps, and there's also a handful of third-party apps with support.

And in practice, it works pretty well — though it is perhaps a little easy to forget that it exists at times. We found it most useful for previewing content that would otherwise require you to switch apps — press down on a web link in an email, for example, and you can peek through to see the website without actually fully jumping over to Safari. Do the same on a date-and-time and you can quickly create a calendar appointment. And on the homescreen, a firm push on a supported app icon will give you shortcuts to common actions — on the camera, for example, you can immediately start recording a video or use the front-facing camera to take a selfie.

Pressure-sensitivity means you can push harder for different actions and results too. Futuristic racing game *AG Drive* is a good example; the more firmly you press down, the harder you push the accelerator. In Apple's Notes app, you can also get a thicker stroke in drawings depending on how



In many places, 3D Touch will let you preview links that would otherwise require opening external apps — here, we've 'peeked' at a web link from within an email.



3D Touch adds a 'Quick Actions' feature, letting you press an app icon for fast access to common tasks.

much pressure you apply.

There's a bit of a learning curve to 3D Touch; when you're starting out, it's easy to press-and-hold by accident, and finding and remembering where you can use the feature isn't as intuitive as, say, using multi-touch for the first time.

A NEW SNAPPER

Another key upgrade is the camera, which has gone from 8MP to 12MP. But extra resolution aside, it's actually pretty difficult to tell apart photos taken with an original 6/6Plus and these new S units. That's because last year's iPhones already had excellent camera performance. Yes, there's a little bit more detail visible in low-light shooting and compositions with high-contrast (shooting a room with a bright window, for example), and the S's seem to have slightly more vibrant colours — reds, greens and blues all 'pop' a teeny bit more.

Apple's also enabled more camera features, like Live Photos, which gives you a little context around each of your snaps by recording a short 3-second video with each one, which becomes visible when you tap-and-hold on a shot. It's a neat ability to have, albeit something that can only be shared out to other iPhone and Mac users. Also cool is 4K shooting from which you can export 8MP stills, and the ability to create image-stabilised time lapses, letting you make smooth little stop-motion videos of walking journeys.

CHIPGATE?

It seems we can't escape an iPhone launch without some kind of controversy — that's the price Apple pays for shipping tens of millions of the devices — and this year's has to do with the CPUs inside. Apple's always used a variety of suppliers for the components in iPhones — it's not uncommon for storage, memory and displays to all have multiple manufacturers. This year Apple's had to go with two for the main A9 processor — Samsung and TSMC.

While the two chips seem to be equally fast, some users have noticed that, when running a synthetic battery test, TSMC phones get much better battery life than Samsung ones — in the order of 20% — and run cooler too. Apple's actually issued a statement on this, and while it's not denying the results, it is saying they don't

reflect real-world usage — and it's countered that based on its own surveys (it has access to diagnostic data from millions of iPhones) the real difference is only 2-3%.

We don't have enough objective data at this point to confidently weigh in (our 6 and 6 Plus test units were both TSMC models), but we can't deny that it is a bit disheartening that benchmarks — even synthetic ones — show that there's potentially this much difference between CPUs. Apple's known for its high standards, so to see any sort of compromise is disappointing. It wouldn't stop us from buying one, but those who use their phones intensively — heavy gamers, for example — might want to dig into the issue a bit further and take a 'wait and see' approach before committing to a purchase.

REGULAR VS PLUS

The differences between the two sizes are pretty much identical as last year — the 4.7-inch 6S is great for one-handed use, while the 6S Plus's 5.5-inch screen is great for gaming, movies and just generally being able to see more on screen. We still think the Plus is a little on the large size in terms of footprint: we'd happily accept a little extra thickness in exchange for a narrower face width — the 6S Plus looks and feels like a big phone next to similar-sized Androids.

As with last year, the Plus does get significantly better battery life at times though — streaming ABC News 24, the 6S managed 8:04hr, while the Plus stretched to an amazing 14:17hr, basically matching the difference in the battery capacity between the two (1715mAh vs 2915mAh).

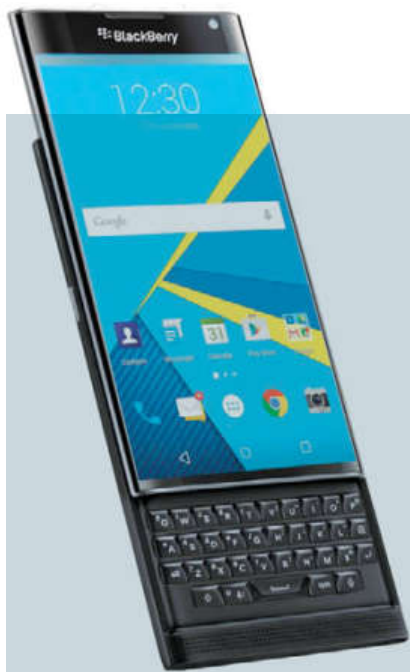
A TENTATIVE VERDICT

Taking a step back, while these new iPhones do offer a bit more than we usually see from 'S' years, if you're already rocking a 6 or 6 Plus there's very little here that makes these a must-have upgrade. 3D Touch is neat to have, and Apple has taken the time and effort to ensure it's been well-applied throughout its own apps, but the feature never quite makes itself feel essential. And the same goes for the other new elements that having an S model unlocks, like Live Photos.

On the other hand, if you're still on an iPhone 5S or older (or looking to leap across from Android) these are undeniably great smartphones — and ones that just got a little bit faster, more full-featured and future-proof. ■



3D TOUCH IS UNDOUBTEDLY THE MOST INTERESTING NEW FEATURE, TAKING SCREEN INTERACTION BEYOND JUST UP/DOWN AND LEFT/RIGHT WITH THE ADDITION OF IN AND OUT.



[BLIP]

BLACKBERRY ANDROID PHONE IS OFFICIAL

GET PRIVY ABOUT THE BLACKBERRY PRIV.

Details have emerged around BlackBerry's move into the Android ecosystem, with the BlackBerry Priv officially announced as its next smartphone. It'll have a slide out hardware keyboard, and is expected to have a 1440p display, a Snapdragon 808 processor, 3GB of RAM, 32GB of storage (plus an SD card slot), an 18MP camera on the rear and a 5MP camera on the front. [SL]

[MEDIA EXECS GRINNING EAR-TO-EAR]

BITTORRENT TRAFFIC SHARE HITS NEW LOW

ARE GOOD, AFFORDABLE LEGAL OPTIONS LIKE NETFLIX FINALLY HELPING TURN USERS LEGIT?

According to a recent report from the network management company Sandvine, it appears that the total amount of internet bandwidth spent on BitTorrent traffic in Europe has fallen significantly in the last year, dropping below 10% for the first time since the file sharing boom commenced. The report states that 8.44% of Europe's total internet traffic can be attributed to peak hour torrenting, which is a far cry from the 17.99% that was reported only two years ago. And it's not just Europe — the Asia Pacific region is also experiencing the same downward trend. So what's behind the huge decline in torrent traffic? Perhaps easy access to content through legal channels has had a hand in turning pirates into legitimate media consumers — a Sandvine report from May this year stated that 36.5% of all downstream peak hour internet bandwidth in North America could be attributed to the streaming giant, Netflix. During the same period, 15.6% of all peak hour traffic was accounted to YouTube. [SL]



[WINDOWS WITHOUT THE PAIN]

Looking beyond the Surface

MICROSOFT AIMS TO TAKE ON THE MACBOOK WITH ITS NEW SURFACE BOOK — THE FIRST LAPTOP IT'S EVER BUILT.

MICROSOFT HAS OFFICIALLY stepped into the laptop manufacturing game with its newest entry in the Surface lineup, the Surface Book. More than just a laptop, this 2-in-1 has a remarkable fulcrum hinge made from flexible aluminium that gives the unit a solid laptop feel, but also allows the screen to flip all the way over into a convertible-style setup. You can also detach the screen entirely and use it like a regular Surface tablet.

Microsoft boasts that its keyboard provides a "perfect typing experience", with keys that allow for almost completely silent typing and a have deep travel distance of 1.6 mm. It's also got a slick glass trackpad.

Specs wise, the Surface Book sports a 12-hour battery, a 13.5-inch, 267 ppi display, and will be available with either a 6th Generation Intel Core i5 or i7 processor. An optional discrete GPU with GDDR5 memory will also be available. The Surface Book is on sale from November 12, with prices starting at \$2,299. [STEPHEN LAMBRECHTS]

[WE'RE FINE WITH IT]

Big Brother is watching you park

AUSSIE CCTV CAMERAS BEING USED TO HAND OUT PARKING FINES.

AND YOU THOUGHT Ceiling Cat was nosy. It's been announced that the Sydney suburb of Manly has implemented monitoring software to catch people who park illegally. The council has applied Microsoft's Azure Machine Learning technology to CCTV cameras in the area to assist police and rangers with the enforcing of parking restrictions. So far, the cloud-based tech has been installed in 25 smart parking meters, 4 smart parking stations, 100 CCTV cameras and 20 wireless access points around the seaside suburb. Manly council says it intends

to use the analytics data acquired by the technology to target problem areas with patrols and resources.

Manly Council's CIO Nathan Rogers says the tech has "really only scratched the surface" of what it could do for the suburb, stating that it's also being considered for crowd control, surf conditions and to keep the community safe. Our advice? Make sure you behave responsibly the next time you're in the Manly area — you never know who might be watching you...

[STEPHEN LAMBRECHTS]

[BLIP]

APPLE FACES FINE OVER SAME-SEX COUPLE EMOJI

RUSSIA'S NOT PUTIN UP WITH IT ANY LONGER.

Having recently taken its fight against same-sex couple emoji to Facebook, the Russian government is taking its beef even further, as it's now considering fining Apple one million Rubles (US\$15,000) as the offending emoji characters are featured on the iOS keyboard. Russia considers the same-sex emoji a direct violation of its 'homosexual propaganda' laws, which were established in 2013. [SL]

[BLIP]

CONTROVERSIAL HACKTIVIST EDWARD SNOWDEN JOINS TWITTER

WILL HE TWEET SECRETS OR JUST CAT PICTURES?

Thought your tweets were controversial? Think again – former government whistleblower and accused traitor Edward Snowden has joined Twitter. Snowden has already pulled over 1.4 million followers and counting, which is a lot of attention for a privacy advocate. Don't expect a follow back, though – Snowden only follows one Twitter account, and funnily enough, it belongs to the NSA. [SL]

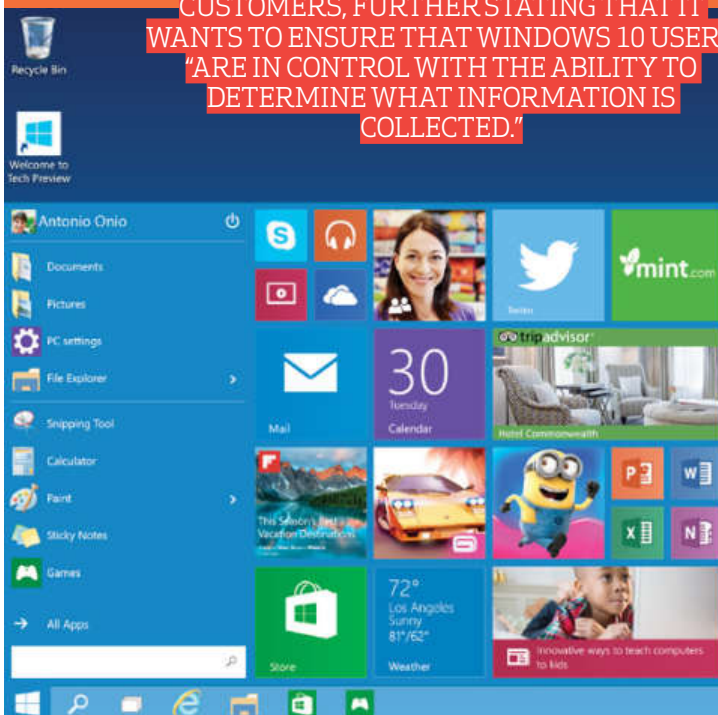
[NOT BULLETPROOF AFTER ALL]

APP STORE SUFFERS MAJOR MALWARE INFECTION

...BUT EXPERTS SAY NO REAL DAMAGE WAS DONE.

Apple's App Store experienced its first major attack recently, as a tainted version of the Cupertino company's developer tools led to over 4,000 malware-infected apps slipping past its rigorous app review and submission process. The infected apps, which originate mostly from China, were created using XcodeGhost, a counterfeit version of Apple's app creation software. Due to China's strict internet filtering policies, legitimate app developers in the country are routinely forced to find alternative domestic sources for their developer tools. While these developers thought they were using a legitimate version of Xcode, they instead ended up with something far more malicious. Apple has already removed the infected apps, including the Chinese build of Angry Birds 2, stating that they "are working with the developers to make sure they're using the proper version of Xcode to rebuild their apps." The malicious code works by compromising the app user's privacy, leaking their personal information to hackers. Thankfully, Ryan Olson, Palo Alto Networks' director of threat intelligence, has stated that no real damage was done. [SL]

“WINDOWS 10 COLLECTS INFORMATION SO THE PRODUCT WILL WORK BETTER FOR YOU,” SAID THE REDMOND COMPANY TO ITS CUSTOMERS, FURTHER STATING THAT IT WANTS TO ENSURE THAT WINDOWS 10 USERS “ARE IN CONTROL WITH THE ABILITY TO DETERMINE WHAT INFORMATION IS COLLECTED.”



[JUST FRIENDLY SNOOPING]

Microsoft seeks to calm Windows 10 privacy concerns

A LITTLE CLARIFICATION GOES A LONG WAY?

AFTER COPPING A significant amount of flak regarding its privacy policies surrounding the release of Windows 10, Microsoft has published a set of detailed articles explaining exactly what those policies consist of.

“Windows 10 collects information so the product will work better for you,” said the Redmond company to its customers, further stating that it wants to ensure that Windows 10 users “are in control with the ability to determine what information is collected.”

Microsoft went on to explain that the collected data, which is encrypted and

stored in secure facilities, “doesn’t include any of your content or files,” and that it has taken “several steps to avoid collecting any information that directly identifies you, such as your name, email address or account ID.”

Regarding Personalisation Data, Microsoft also promises that only trivial information is collected, such as “knowing whether you are a Seattle Seahawks fan or Real Madrid fan, in order to give you updates on game scores or recommend apps you might enjoy.”

[STEPHEN LAMBRECHTS]



[IPAD RIVAL]

Samsung's tablets come of age

SAMSUNG'S LATEST GALAXY TAB CAN FINALLY HOLD ITS OWN AGAINST THE IPAD.

[STEPHEN LAMBRECHTS]



4

SAMSUNG GALAXY TAB S2

8-inch Wi-Fi, \$499,
8-inch LTE, \$649
9.7-inch Wi-Fi, \$599
9.7-inch LTE, \$749
www.samsung.com/au

CRITICAL SPECS

Android OS 5.0.2, 9.7-inch or 8-inch Super AMOLED display @ 1,536 x 2,048 pixels, octo-core Exynos 5433 CPU, 3GB RAM, 32 or 64GB storage, 8MP rear and 2.1MP front-facing cameras, capacitive fingerprint sensor, 802.11b/g/n/ac Wi-Fi, optional LTE, 389g.

WITH THE ORIGINAL Galaxy Tab S, Samsung finally provided Apple's iPad with some serious competition in the tablet space. Now, the Korean company is back with what's perhaps its most overt attempt to deliver its own iPad-like experience — and for the most part, the new Galaxy Tab S2 succeeds.

Direct comparisons to Apple's tablets are easy to make, with the S2 adopting the iPad's signature 4:3 aspect ratio and eschewing the 10.5-inch and 8.4-inch displays of the original Tab S in favour of 9.7-inch and 8-inch versions. The larger model has also been rotated 90 degrees, with its home button (which has a slicker touch-based fingerprint scanner) moved to make the tablet more comfortable when held vertically. While this might annoy those who use their tablets primarily for viewing video content, it makes web browsing and reading much more natural.

While the iPad was very obviously an inspirational factor in the S2's form, the rest of the tablet is pure Samsung. The S2 has a metal frame with a thin chrome edging and a rear that's made of smooth plastic. Sure, it's not particularly grippy or quite as premium as the iPad's aluminium chassis, but it's very comfortable to hold in the hand. It's also lighter and thinner than the iPad Air 2, weighing in at just 392g for the 9.7-inch and 272g for the 8-inch, with a thickness of only 5.6mm for both models (for comparison's sake, the iPad Air 2 weighs 444g and is 6.1mm thick).

Samsung's signature capacitive buttons make a return, and the device's power button can still be found on its side. It's also got a microSD Card slot, which can add up to 128GB of storage, and just below that (on the LTE models of the Tab S2) is where you'll find a Nano-SIM slot.

The S2's display matches the iPad Air 2's resolution

exactly (1,536 x 2,048 pixels), even sharing the same 264ppi pixel density (320ppi on the 8-inch version) as Apple's IPS display. That said, we might give the edge to the S2, as its Super AMOLED display is breathtakingly vibrant, with a brightness and depth of colour and contrast that make the iPad Air 2 seem muted by comparison.

Though Samsung's latest runs a slightly outdated version of the Android OS (5.0.2 Lollipop), it does thankfully boast some software tweaks of its own, including Quick Connect functionality — this allows you to sync with a nearby (compatible) Samsung smart TV to throw video content at it.

In terms of performance, the S2 performs admirably, if not spectacularly. Though it's much quicker than the original Tab S, it uses an older Exynos 5433 octa-core processor developed for last year's Galaxy Note 4. Unsurprisingly, it performed similarly to that handset in our graphical benchmark tests, but was left in the newer Galaxy S6's Exynos 7420-sporting dust.

Its battery capacity is also a downgrade from the Tab S1 — the 9.7-inch Tab S2 has a 5,870mAh battery (compared to the 7,900mAh battery in the 10.5-inch Tab S), while the 8-inch model sports a 4,000mAh battery (4,900mAh in the original 8.4-inch version). Still, in PCMark 8 Android's tough battery life test, this 9.7-inch model lasted a respectable 7:12hr.

Though it's perhaps a little disappointing that the Galaxy Tab S2 doesn't pack Samsung's latest Exynos CPU, it's the most attractive tablet the company has ever made, and also the most pleasurable to use. It feels as though Samsung's finally nailed its iPad competitor this time around.



2019

THE YEAR APPLE IS SAID TO BE SHIPPING ITS MUCH-RUMOURED ELECTRIC CAR.

Titan, Apple's codename for what's presumed to be the company's secret electric car project, has been a hot topic since earlier this year, when the Cupertino company was sued for poaching engineers from US car battery manufacturer A123 Systems. The project is reportedly now in full swing according to the *Wall Street Journal*, with an unnamed source reporting that Apple has set the car's shipping date to fall in 2019 — though the paper also cautioned that the phrase 'target shipping date' could be Apple-speak for the date it's set its engineers to sign off on a final prototype, rather than the day products actually infiltrate the garage.

1,000,000 TONS

THE EXCESS AIR POLLUTION VW VEHICLES ARE RESPONSIBLE FOR AFTER CHEATING ON US EMISSIONS TESTS.

Volkswagen's admission of rigging of over 11 million cars to artificially report lower emissions have understandably angered customers around the world for the personal effects of owning a less economical vehicle, but more broadly, it also means that the company has added an extra 1 million tons of greenhouse gasses and pollution to the world's atmosphere. This value is approximately equivalent to the collective yearly emissions of all the power stations across the United Kingdom. 482,000 VW and Audi cars have been recalled in the US for having the dodgy tech, which only reduced emissions results during test conditions.



The news in numbers

THE KEY FIGURES BEHIND THE LATEST ISSUES AND TRENDS IN TECHNOLOGY.

[JOEL BURGESS]

10-20 years

NETFLIX CEO BELIEVES ALL TV WILL BE ONLINE WITHIN THE NEXT TWO DECADES.

Although new subscriptions for cable TV companies in the US has been on the decline since 2009, the industry passed a new milestone in August, as the total number of cable channel customers started to go backwards. The stats now suggest that cable television has a very finite lifespan, and in August Netflix CEO Reed Hastings wasn't reluctant to point out the writing on the wall, predicting that all television will be delivered online in the next 10-20 years.

5 years

THE TIMELINE FOR THE CONSUMER RELEASE OF MICROSOFT'S HOLOLENS HEADSET.

Microsoft showed off a demo of its exciting HoloLens augmented reality headset at a developers conference in April, and promised at the time to have headsets for developers in 2016. But in a more recent interview in September, Microsoft CEO Satya Nadella let drop that for the tech giant, the HoloLens "is really a five year journey." And if you were hoping to play *Minecraft* on your dining room table next Christmas, you'll likely be disappointed to know that Nadella also mentioned the headsets would be designed for business applications first.

5.6 million

THE NUMBER OF US OFFICIALS' IDENTITIES REVEALED IN HACK.

If your passwords or bank account numbers are stolen by cyber criminals it can be a considerable ordeal to change them, but if hackers manage to nab unchangeable biometric identifiers like fingerprints, you've got a much bigger problem. Though the hack on the US Office of Personnel Management — responsible for the nation's database of government officials and civil servants — has been widely reported on since June, in September the agency confirmed that the hack was even worse than expected, with records of over 5.6 million employee fingerprints among the data stolen, including many from individuals with intelligence or military security-clearances. ■





[I F&%\$#@* LOVE SCIENCE!]

Pop science

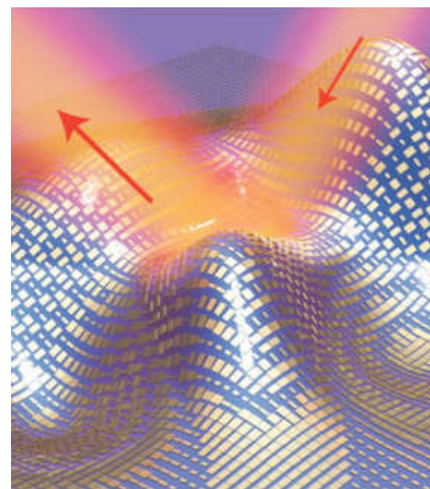
THE LATEST DISCOVERIES, INVENTIONS AND SCIENCE NEWS
THAT'S HELPING SHAPE THE WORLD OF TOMORROW.

Elon Musk suggests nuking Mars in the name of science

WHILE NASA URGES UNI STUDENTS TO HATCH A PLAN FOR MANNED MARS MISSION.

JUST TO BE clear, the tech wonderboy, Tesla Motors CEO and founder of Space X doesn't want to destroy the Martian planet, but Musk proposed using nuclear explosions as one possible solution for defrosting Mars' polar ice and heating its atmosphere — a necessary step towards colonising it. Musk's statement

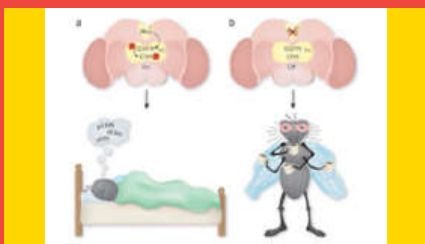
coincided with a call from NASA for university students to submit plans for a manned Mars mission. Students have until November 5th to submit a mission plan, which must include a way to slow and land the 15-30 ton manned spaceship in Mars's thin atmosphere.



Invisibility cloak developed by Berkeley researchers

HIDING IN PLAIN SIGHT NO LONGER JUST THE DOMAIN OF WIZARDS.

Scientists at the University of California in Berkeley have announced they've created a flexible material that can deflect the light around a 3D object, essentially rendering it invisible. Though the prototype has only been observed on the microscopic scale, the researchers noted that the material should fare well on a larger scale and could potentially conceal objects visible to the naked eye. The discovery represents the culmination of a decade of research by the scientists, which focused on bending light around an object rather than reflecting it -- a phenomenon that does not exist in any known natural objects.



NEXT TIME YOU SLEEP IN, BLAME YOUR GENES

Turns out some of us are just early birds and night owls by birth.

While studying the sleeping habits of fruit flies, Researchers at the University of Leicester in the UK have identified 80 genes that are believed to influence the insects' circadian rhythms. Based on a gene profile, the researchers are able to effectively determine a fly's tendency to be an early riser or a night owl. Because the circadian rhythms of the fruit fly tend to be similar to that of humans, the research suggests that genes could be an important part in our own sleeping patterns too.



UNSW RESEARCHERS MAKE METALLIC GLASS

A TERRIFYING STEP TOWARDS A TERMINATOR? Although scientists have long been aware of the potential to create specific combinations of metals that can be bent and even blown like glass, the process of making them has so far been fickle, unpredictable and expensive. But researchers at the University of New South Wales have managed to map out the binding structure of the glass alloy, allowing them to predict and note recipes for over 200 different metallic-glass materials. The binding properties not only allow it to be highly flexible at particular temperatures, it is also on average around three times stronger than steel.



FIDGETING: THE ANTIDOTE TO SITTING TOO LONG

STUDY SUGGESTS FIDGETING COUNTERACTS THE HEALTH EFFECTS OF YOUR DESK-JOB.

According to the experts, sitting is basically the new smoking. Well, it might not be quite that bad, but the general consensus among health professionals is that sitting still for extended periods of time is really bad for you — increasing the risk you'll develop anything from heart disease to colon cancer. But a recent study of over 12,000 women in the UK found that those who fidget can actually cancel-out all the negative consequences associated with extended seated periods. We guess restlessness is the new exercise, then. ■

[CROWDFUNDED]

Kickstarted!

Nov
2016

FROM THE PRACTICAL TO THE QUIRKY TO THE DOWNRIGHT STRANGE, CROWD-FUNDING WEBSITES HAVE ALLOWED THE CREATION OF AN AMAZING RANGE OF PRODUCTS. HERE'S A SELECTION OF LATEST PROJECTS THAT PIQUED OUR INTEREST.

[PAUL TAYLOR]

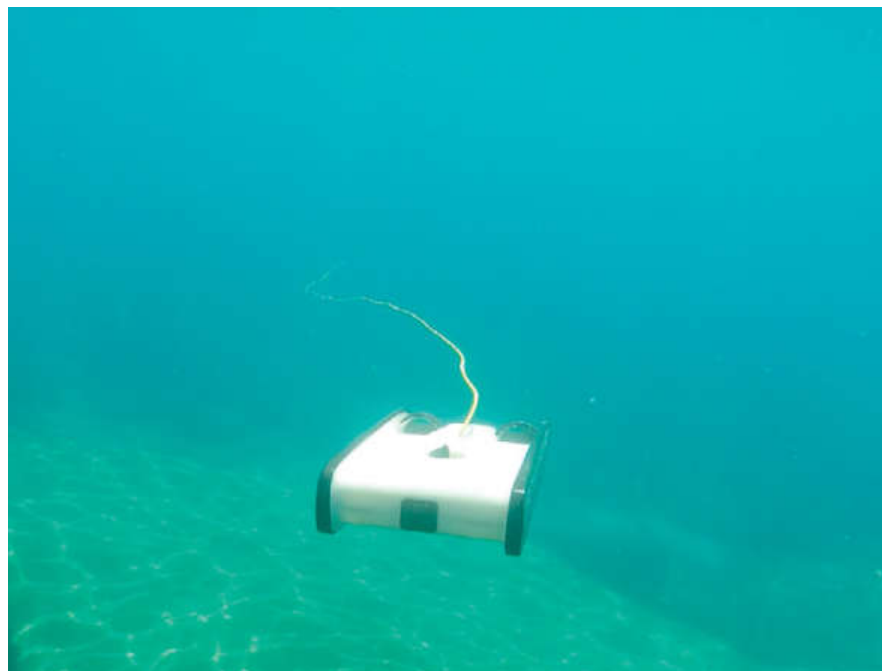
[DOWN WHERE IT'S WETTER]

OpenROV Trident

openrov.com | Initial goal: US\$50,000 | Raised: \$619,064 from 946 backers (25 days to go) | RRP: US\$1,199

It's fair to say that modern man has a fascination with recording every single thing he can and can't see. But unless you're A) an exceptional free diver or B) James Cameron, you're only going to get fleeting glimpses of life underwater on your action cam. Not anymore. The Trident is a stable underwater vessel that's

controlled by a smartphone, tablet or even Oculus Rift from the surface, boasting vertical travel with no pitch and zippy acceleration. The creators say that piloting the Trident is more like flying, and with a 25m tether at the end of a Wi-Fi buoy, you'll be able to get into some fascinating nooks and crannies.



[SAD TROMBONE]

Failed Kickstarter of the Month

SOME CROWDFUNDING IDEAS WERE NEVER DESTINED TO SUCCEED.

[CLIPPED]

SOLARCLIP

solarclip123.simplesite.com | Initial goal: US\$10,000
Raised: US\$1,599 from 24 backers
RRP: US\$69

Some genius ideas just weren't meant to be (Betamax), some were before their time (Apple Newton), and some fill a niche that make absolute sense to their creator but in practice look like something cooked up in a cheese dream. Enter, the clipboard that also recharges your mobile phone, using solar panels. Perfect for foremen working



outside, with their reams of paper, and utterly useless for anyone else. Well, we say 'perfect' -- one problem we've already spotted is that the panels are on the reverse side of the clipboard, pointing away from the sun. Add to the fact it's literally just a clipboard with solar panels lashed to the back and it screams lo-fi.

[WWW.TECHLIFE.NET]



HOTSPOT
KICKSTARTED!

[PEOPLE POWER]

KICKSTARTER PREFERS PEOPLE OVER PROFITS

WEBSITE VOTES TO BECOME A PUBLIC BENEFIT CORPORATION.

In late December, Kickstarter decided it would become a 'public benefit corporation', which in layman's terms means it's now obligated by law to make a positive impact on society. This is good news -- by shunning an IPO (private investment), the website that provides a platform for entrepreneurs is committed to helping small ideas become big ones, rather than servicing the wants of potential investors.

"We don't ever want to sell or go public," Yancey Strickler, Kickstarter's chief executive told The New York Times. "That would push the company to make choices that we don't think are in the best interest of the company."

Mar
2016



[SLICK SHOT]

STEADXP

steadxp.com | Initial goal: €150,000
Raised: €424,434 from 1,959 backers (4 days to go)
RRP: From €250

Modern man has a fascination with recording every.... wait, hang on, we've done that line. Anyway, the only thing worse than missing out on filming a once-in-a-lifetime opportunity is filming it, but having a camera so shaky it's like it's being operated during an earthquake. SteadXP's self-titled unit fixes that, stabilising video footage shot on action cams and DSLRs. The device has an accelerometer and a gyroscope built in, and pairs its motion data with the material from your device. You can choose how smooth you want the result to be, and the software does the rest, making tracking shots and POV recordings look like they were shot by Spielberg.

[015]

LIFETOOLS

ENHANCE YOUR LIFE WITH TECH

[HIGH VOLTAGE]

Lifetools for better battery life

GEAR, APPS AND KNOW-HOW TO HELP SUPERCHARGE YOUR SMARTPHONE.

[JOEL BURGESS]

IF YOU BELIEVE the plot lines of many B-grade movies, running out of battery can often be the difference between life and death. OK, so this kind of situation is probably a tad hyperbolic, but running out of juice on your device is still really annoying. As our mobile devices have become more powerful, they've also gotten more power hungry — and at the moment we seem to be stuck in a bit of a battery life rut, where smartphones can brag about a 2 day battery life and your favourite toy quadcopter takes five times longer to charge than to keep it in the air. As such, there's never been a better time to discover how to get more from your battery, and there are plenty of apps, gadgets and websites out there to help you do just that.



[GADGETS]

Fuel Micro Charger

FLAMES AND BATTERIES HAVE NEVER MIXED SO WELL.

Android, US\$20; iOS, US\$30 | devotecindustries.com/fuel2

This tiny Kickstarter campaign caught fire earlier in the year and by August, DevoTech Industries had developed and released this fully-fledged emergency smartphone battery pack that fits on your keyring. With unique models developed for either Android or iOS devices, the little 220mAh battery is designed to get you out of a tight spot, giving you an extra 5% to 20% extra juice depending on the device. It's really only useful for emergencies, but it could be worth it if you get in a fix.



Better Re

MAKE USE OF OLD SMARTPHONES.

Without battery, US\$49; battery included, US\$55 | enlighten.today

This modular portable battery charger also began its life as a Kickstarter, although it hasn't quite made it to full production yet, but you can pre-order one. Unlike many commercial portable smartphone battery chargers that require the company to forge new lithium batteries, Better Re's modular design allows it to fit an old removable smartphone battery and you can purchase the product with or without a recycled smartphone battery included.

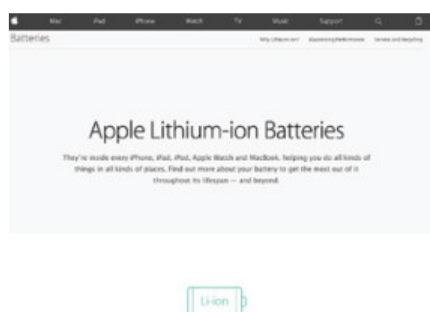


Biolite Energy Campstove

YOUR OWN MINI GENERATOR.

\$220 | biolitestove.com

If you're planning on being away from power for some time, your options for keeping your smartphone charged are obviously a little slim. Charging your smartphone when you're camping, in particular, narrows those options right down. The BioLite campstove aims to keep you juiced up, however: it's a tiny combustion generator that converts heat into a stable 2-watt USB output, meaning you can charge your devices even when you're hundreds of kilometres from a powerpoint. What's even better is that you can use it while you cook your dinner, too.

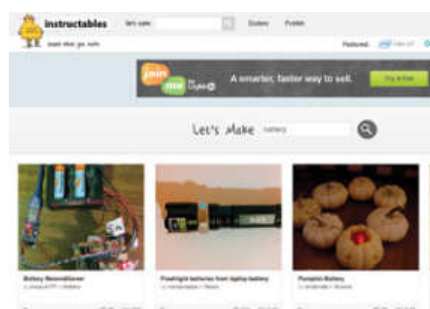


[WEBSITES]

APPLE BATTERIES

REAP THE FRUITS OF BETTER BATTERY LIFE.
apple.com/au/batteries

If you've got an iOS device, you're probably already aware that its battery life could be better. Even Apple itself knows this obvious fact and has created a portal to help you get more battery-life from your devices. The portal has tips on maintaining your lithium-ion batteries, how to fix them if they're malfunctioning, and general performance and settings tips to minimise battery drain. There's some handy info in here if you want to save power without downloading a dedicated app.



INSTRUCTABLES

RECIPES FOR BETTER BATTERIES.
instructables.com/howto/battery

Instructables is a site dedicated to DIY fixes creations and tinkering, that just happens to have a heap of instructions on how to build or modify your own batteries. Whether you want to use fruit to give your phone a weeny bit of extra power, or you're keen to make a backup battery that will keep your device running well after it realistically should, Instructables has a bunch of dedicated builders keen to help you do just that.

Birksun Elevate Backpack

MAKE YOURSELF A SOLAR NINJA TURTLE.
US\$170 | birksun.com/products/elevategrey

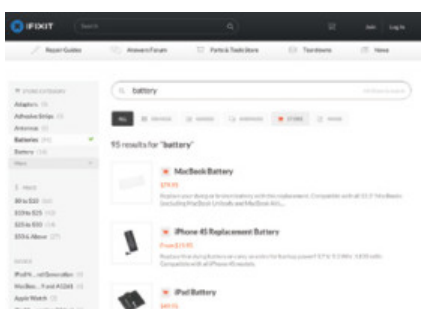
This is one of the more intriguing smartphone-charging backpacks we've seen floating about the web. The backpack's mounted solar panels are able to deliver 4.4 watts when in direct sunlight and you can buy an additional 5,000mAh or 10,000mAh battery to leave charging if you don't want your phone tethered to your backpack for extended periods of time. For US\$170 it isn't a bad solution, even if you're planning on using it in a mostly urban environment.



BATTERY UNIVERSITY

IT'S TIME TO GO BACK TO BASICS.
batteryuniversity.com

If you've been skimming through this list and are aware of all of these battery-saving gadgets, apps and tips, then maybe it's time to take the next step. Battery University is a great resource to learn about how different modern batteries work and how to get the best battery performance from each type. This crash course in batteries may be what's required to make your device seem like it's powered by Iron Man's nuclear reactor.



IFIXIT

KNOW THE BATTERY PACK YOU'RE PACKING.
ifixit.com

If you're looking for information about your device's battery, the teardown legends at iFixit (who recently had their app pulled from the iOS App Store for an unauthorised deconstruction of the upcoming Apple TV) will know what voltage you're running under the hood. With insights into the type of battery in any particular device, how it works with the system and a store for replacement batteries, iFixit is a handy resource for those with battery woes.



[ANDROID, IOS] BATTERY DOCTOR

I NEED A TRICKLE CHARGE, STAT!
Free | cmcm.com/en-us/battery-doctor/

Though we're not quite sure this app's finished its doctorate in battery health, it's at least developed a good bedside manner and can scan a number of your smartphone's most battery-hungry settings and optimise them with the push of a single button. In addition to this, Battery Doctor has three other roles: it can serve as a recharge manager, a battery profile creator and an app power-usage ranking system. A decent bit of software if you're looking for ways to increase your battery life.



[ANDROID] JUICEDEFENDER

ACTIVELY SAFEGUARDS YOUR
PHONE'S BATTERY.
Free | tinyurl.com/TLA44-Juice

While Battery Doctor will help you diagnose your battery dramas and can tweak them while you've got the app open, JuiceDefender operates a little more pervasively, keeping your phone in specific states to preserve battery all the time. After opening the app you basically choose what type of battery-saving profile you'd like the device to operate in and decide how many features you're willing to sacrifice in order to squeeze as much battery from your Android device as you can.



[ANDROID, IOS] IF BY IFTTT

GET CREATIVE WITH YOUR
SMARTPHONE BATTERY.
Free | ifttt.com

IF can do a number of things on your smartphone, but if you're looking to conserve battery when your phone is running low — or conversely don't want battery saving to affect your smartphone's performance — then this app is useful. IF allows your phone to recognise specific smartphone conditions — your battery being under 20%, say — and then automatically turn off battery chugging components. These are customisable, so there are plenty of creative ways you can conserve power.



[ANDROID] GREENIFY

PRUNING THE BACKGROUND APP
TREE.
Free | tinyurl.com/TLA44-Green

Many battery-saving apps take the approach of attempting to preserve power by tweaking performance or hardware settings. Greenify is a little different, focusing instead on the plethora of applications that run in the background on your smartphone. Basically, Greenify will show you an ordered list of the apps most responsible for sneakily consuming your juice and then allow you to put them into hibernation. We've found it works well alongside other system-based power saving apps and can boost that battery life on top of any system settings tweaks.

[BARGAIN HUNTER]

All about shipping forwarders

IF AN ONLINE SHOP DOESN'T SHIP TO AUSTRALIA, WHAT ARE YOUR OPTIONS? WE REVEAL EVERYTHING YOU NEED TO KNOW ABOUT SHIPPING FORWARDERS.

[LINDSAY HANDMER]

BUYING ONLINE MAY have revolutionised the shopping experience, but here in Australia we are still somewhat limited in choice from local retailers. Buying internationally opens up new options, but it's not always possible to get the item you want shipped down under, let alone for a reasonable price. Fortunately there are a range of companies out there that act as a shipping middleman — the online retailer sends them your purchase and they forward it on to you, anywhere in the world. It's not just shady companies that may lose your package either — even Australia post has a mail forwarding option available. While the lowered exchange rate has made some overseas shopping less appealing, the "Australia Tax" on many items means that buying overseas is still a good option.

WHY USE A SHIPPING FORWARDER?

The major retailers all offer international shipping, but for smaller stores or one off items on eBay or Etsy, there is simply no way to get it directly to Australia. Equally importantly, shipping forwarders can actually be cheaper than international postage in the right circumstances. It seems counter intuitive, but with high volumes, the forwarding companies can often negotiate very low shipping rates. The best also do package consolidation — all your purchases can be repacked into a single box for a small fee, then shipped out together. For shopaholics, this can very quickly add up to major savings. Most companies offer free or cheap package storage, so your purchases don't need to be all at once. The companies also offer a range of insurance and tracking options for extra peace of mind. One other important aspect of mail forwarding is that the delivery address can be in a state or area that levies a smaller amount (or none at all) of tax, saving even more money.

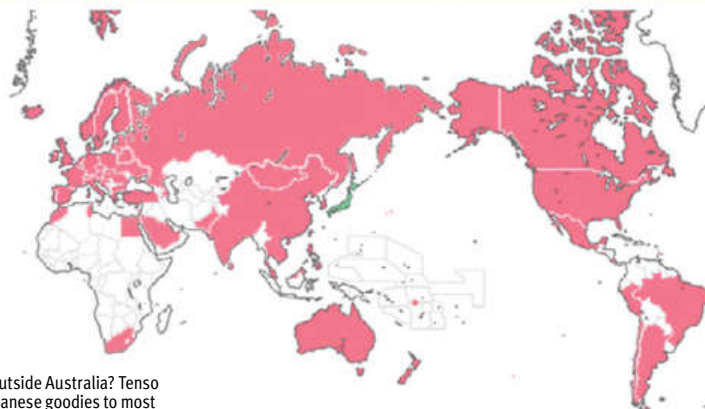


Mail forwarding is big business and companies such as Shipito are building new warehouses to cope with demand.



While offering a familiar name and local customer support, Australia Post's ShopMate is more expensive than a lot of the overseas competition.

Countries we deliver to!



Travelling outside Australia? Tenso delivers Japanese goodies to most countries around the world.

Some shipping forwarders have a full service offer, where you simply select the item wanted and for an extra premium, it is purchased and shipped to you. Taking it a step further, some even offer personal shoppers that can go and buy items only available in physical stores.

THINGS TO LOOK OUT FOR

The usual warranty and support issues with buying overseas still apply, but getting your packages forwarded can add some extra complexities. For a start, any insurance or tracking offered by the seller is only valid up

until the mail forwarding address. From there it's considered delivered and any problems are between you and the forwarder. There are a lot of forwarding companies with great reputations, but be warned that if you use a lesser known company then claiming for a lost package can be a tough process.

The whole forwarding process adds an extra step, so it will take longer to get your delivery.

Some companies that won't ship internationally won't accept foreign credit cards either. Getting your packages forwarded can also run into trouble with paying taxes and import duties, so always check the



Teaming up with local supermarkets, you can get British foods delivered worldwide through Forward2me.com.

relevant rules before you buy. You also need to check prohibited items — just because it can be posted locally, does not mean it is suitable to be shipped over to Australia.

It's also important to compare prices for different items — some forwarders offer better rates for heavier packages, while others are cheaper when it comes to lightweight but bulky items.

AROUND THE WORLD

The majority of the shipping forwarders are located in the USA, followed by the UK and Europe. A lot of Asia is poorly covered, but then again, just about every Chinese gadget imaginable is already available with super affordable international shipping. Japan is the exception, with a healthy array of mail forwarding options.

GETTING STARTED

It can be hard to choose a mail forwarding service, so we have compiled a list of some of the options available.

- ★ **Australia Post ShopMate.** Having the advantage of a well-known name, the AusPost option is overshadowed by the better featured and cheaper competition. Worse, the pricing structure is a little confusing and charged as whatever is greater out of the “cubic” and actual weight.
- ★ **Shipito.com.** US only, Shipito has cheap prices and can consolidate and store packages. For frequent users, you can get a ‘virtual mailbox’ that offers extra discounts. The shipping calculator makes it easy to find out exactly how much shipping will cost before you commit.
- ★ **Stackry.com.** A US based service that makes



Many shipping forwarder companies (such as Stackry) base their warehouses in locations without local sales tax, saving extra money for US purchases.

Rather than paying multiple shipping fees, mail forwarders can consolidate all your deliveries into one box to save money.



“THE MAJORITY OF THE SHIPPING FORWARDERS ARE LOCATED IN THE USA, FOLLOWED BY THE UK AND EUROPE.”

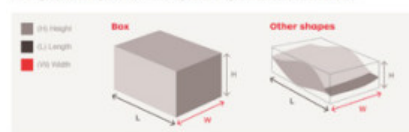
it simple for first time and casual users, with straightforward and well detailed pricing info and no memberships. Stackry also offers package consolidation, 45 days free storage, a personal shopper option and even pictures of your packages.

- ★ **Forward2me.com.** Not just UK based, Forward2me can take deliveries from any EU country across Europe. Prices are reasonable, and they also offer consolidation services. For expats looking for favourite foods, you can get items forwarded from UK supermarkets.
- ★ **Tenso.com.** One of the biggest forwarders out of Japan, Tenso has a fairly basic pricing structure (listed in yen) based on the weight of the package, up to a maximum of 30kg. They take credit card and paypal, and have an English speaking help desk. ■

Calculating the cubic weight of your parcel

1. Measure your parcel

The images below show you how to measure regular and irregular shaped parcels, and suitcases.



Tip: When measuring the length and width of your parcel, always use the maximum points.

2. Cube your parcel

The cubic weight is the parcel's volume in cubic centimetres, divided by 5,000. To work this out, use the formula below:

Height x length x width ÷ 5,000 = cubic weight

For example: 50cm x 30cm x 40cm

= 60,000cm³ ÷ 5,000

= 12kg cubic weight

If the actual weight of your parcel is 8kg but the cubic weight is 12kg, we'll charge you the cubic weight because it is greater. But if the parcel's actual weight is 18kg, we'll charge you the actual weight because it is greater than the cubic weight of 12kg.

Always compare shipping prices — some have a calculated weight charge (based on the size) that can make shipping bulky but lightweight items expensive.

GST AND DUTY

Right now, international purchases under \$1,000 are GST free — anything over that and you need to declare the purchase to customs and pay the taxes. Mail forwarders typically rely on the user to fill out the correct forms, which can result in values being under declared to avoid tax. Of course if customs inspects the package and finds something amiss, you will get charged the tax anyway.

Calculating the potential tax has a few steps — the item value is based

on the exchange rate on the day of export, not the day of purchase or arrival. If the value is under \$1,000, (excluding shipping) then no tax is payable. If the value is over \$1,000, you pay 10% tax on the item and international shipping costs combined. No tax is payable for any shipping fees within the country of origin.

Of course this is all set to change on July 1st, 2017, when GST will be applied to all imports — though how it will be implemented is not yet known.

DISCOVER

ESSENTIAL APPS, TOOLS AND ENTERTAINMENT

[STAY HAPPY]

Apps for building healthy habits

HAVING TROUBLE MAKING A CHANGE FOR THE BETTER?
THESE APPS CAN HELP POSITIVE HABITS STICK.

[TIM BOTHWELL]

AS WE MOVE scarily closer to the end of another year, many of us often reflect on what we've achieved – and figure out what new and exciting challenges we wish to face in the next. While new years' resolutions tend to focus on bigger-picture things like writing a novel, exercising (slightly) more or learning a new skill, it's also important to look at the smaller things we can improve on, like being more productive with our

increasingly-limited time. Here, we've looked at some of the apps that will assist you in making positive changes throughout your day-to-day activities. Whether it's improving your physical fitness, increasing your concentration or becoming better organised, these apps will help build the habits necessary to live a happier, healthier life.

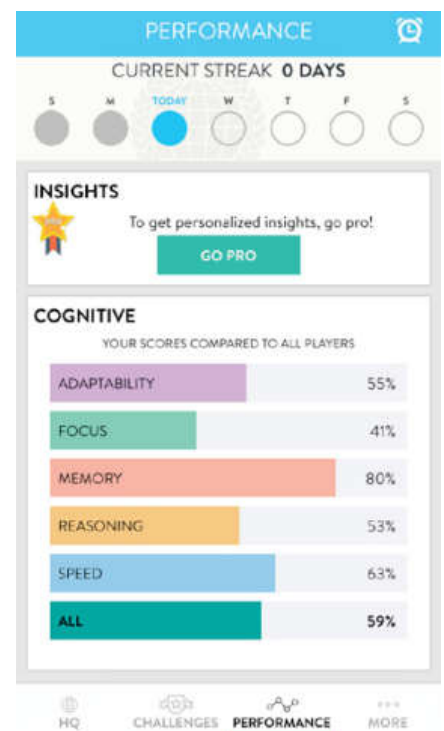
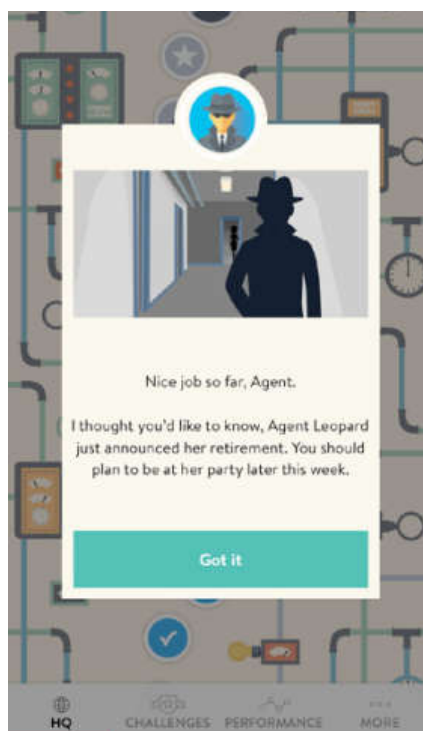


[IOS]

Cognito: Brain Training Games

Free with IAP
www.getcognito.com

There's a saying that with age comes wisdom, but we're not so sure how accurate this is when all you're doing is binging on Netflix for days on end (plot analysis perhaps?). The brain is a powerful tool which, like the body, requires constant workouts to keep it performing at its maximum capacity. Brain training app Cognito sees you follow a secret agent, performing a range of missions designed by neuroscientists to improve areas such as memory, logic and reasoning. As you play, statistics reveal how you're performing in terms of reasoning, speed, memory and other aspects, with the app even linking with Apple's Health app to take into account physical activity. While Cognito is free, the pro version offers unlimited access to all games, along with more detailed reports and insights.





[IOS, ANDROID]
COACH.ME
Free
www.coach.me

Sure, writing down a list of goals is a great first step, but actually achieving them is a whole other story. On a basic level, Coach.me is like any other to-do app, but delve deeper and you'll find a community of like-minded users, motivating you to achieve the goals you set yourself. With categories ranging from health to general productivity, the app supports a variety of tasks such as learning a new language, how to salsa, or improve your level of exercise. Every goal you choose to 'join' gives you access to a group of other members from which you can ask and answer questions about the ways best to achieve that particular goal. Tasks can also be monitored, allowing you to see the progress made overtime.



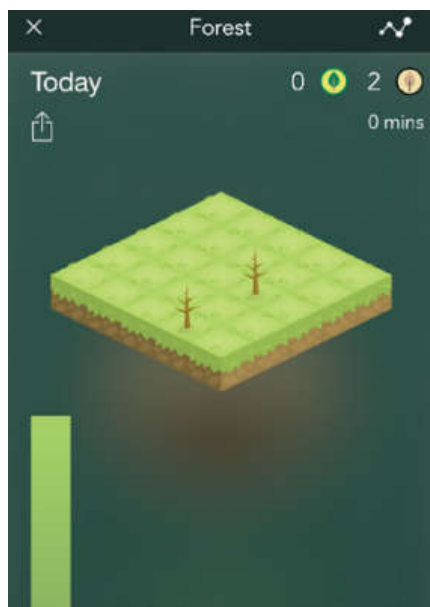
[IOS, ANDROID, WEB]
POMOTODO
Free
pomotodo.com

We're big fans of the Pomodoro technique – a method which involves splitting tasks into shorter, more manageable bursts of energy, separated by small breaks in between. Pomotodo goes one step further by integrating a fully-fledged to-do list into the app. Tasks can be added, rearranged and marked as complete like any other app, but what's unique is how they can quickly be added to a list items to be performed in 25-minute blocks, one after the other. Tasks can be synced across devices, while a history feature lets you look back at past ones – highlighting the length of time needed to complete them, along with the day and time you were at your most productive.



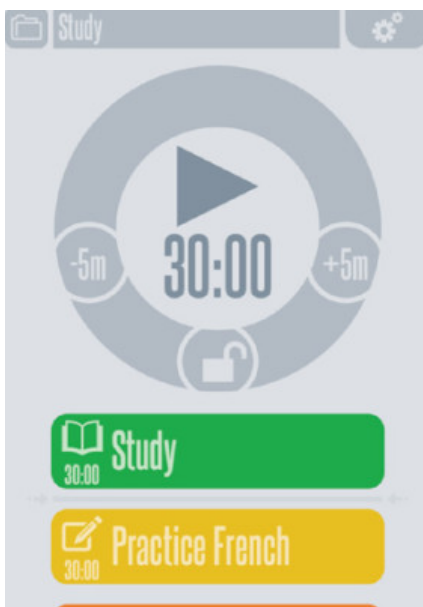
[IOS, ANDROID, WINDOWS PHONE]
WUNDERLIST
Free with IAP
www.wunderlist.com

Sure, your phone's default reminders app is great when it comes to basic task management, but what if you want to take it to the next level? Enter Wunderlist – one of the most well-known to-do list apps currently on the market. Recently acquired by Microsoft, Wunderlist features a simple, clean interface – making it easy to add and complete tasks regardless of whether you're on your phone, tablet or computer. Going further, the app lets you create reminders based on location, attach files and create subtasks. Lists can even be shared with friends – handy if you have a communal shopping list or a number of films wanted to be screened at a movie night. While the app is free to use, a subscription lets you assign tasks to other users, among other things.



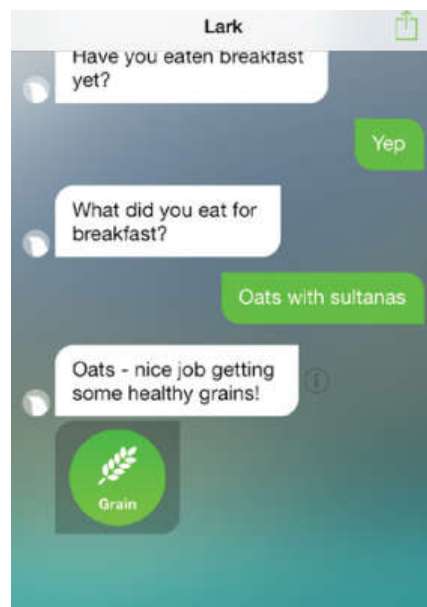
[IOS, ANDROID, WINDOWS PHONE, CHROME]
Forest
\$1.29
www.forestapp.cc

Some of us spend our days pretty much glued to mobile devices. And sure, there are benefits to knowing the latest happenings on Facebook, but what if you begin to feel a closer relationship to your phone than other human beings? Rather than limit or block certain features on your device, the Forest app attempts to guilt you into not using your phone. Simply choose a period on the timer, at which point a virtual tree will begin growing on your device. Exit the app however and the tree will die. Grown trees can be reviewed in a virtual 'forest', giving you an idea of how well you can actually focus, with virtual coins able to be earned that can be then used to plant real trees in different parts of the world.



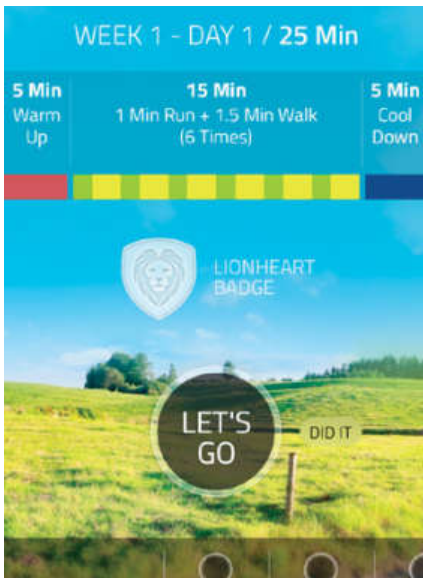
[IOS]
30/30
Free
3030.binaryhammer.com

A relatively simple app, 30/30 hopes to help you accomplish a particular set of tasks within a certain time period. Consisting of a largely minimalist design, the 30/30 is extremely easy to use, whilst still highly functional. It uses a range of gestures to quickly add, remove and reorganise jobs. Creating a new item is as simple as adding a title, and the length of time needed to complete it. If you do find yourself within a deep trance whilst working on a particular task, you can quickly add (or subtract) an extra 5-minutes to complete it. Using iCloud, to-dos can be synced across devices, ensuring you'll always have access to chores no matter where you are.



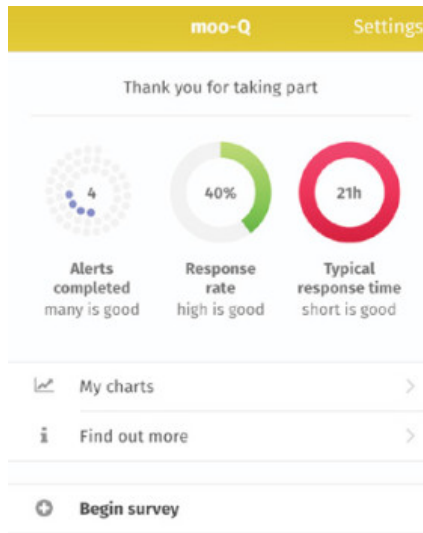
[IOS, ANDROID]
Lark
Free
www.web.lark.com

A food tracker is only as useful as its master – more specifically, how accurately they log that extra crumb (slice) of cake. Lark has the unique approach of relying on a virtual assistant to keep track of food, sleep and exercise – providing unique, personalised insights throughout. Developed by health experts and nutritionists from the likes of Harvard and Stanford universities, Lark focuses less on the manual and complicated task of recording every single mouthful, and instead offers guidance and advice based on the kinds of foods you consume – distinguishing between the health benefits of a grilled chicken breast and a double chocolate brownie with extra chocolate chips (ie. dinner).



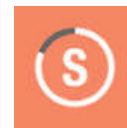
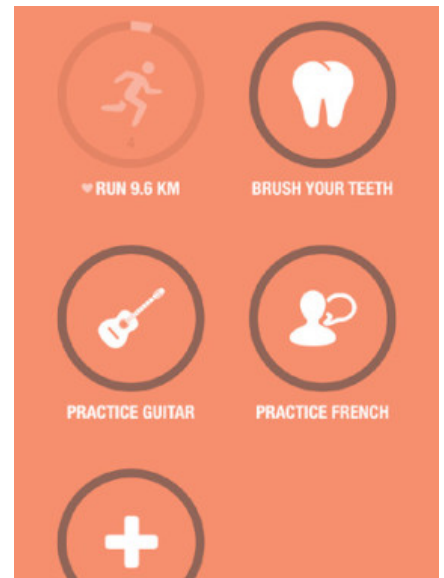
[IOS, ANDROID]
**Couch to 5K
Runner**
Free
www.fitness22.com/

There's often a nagging voice in your head encouraging you to make more positive steps towards better health – a voice repeatedly overshadowed by one telling you to watch another episode of House of Cards on Netflix and to open a pack of chips while you're at it. If for some reason you do feel motivated to get out and move, then running is an easy place to start. For those of us who have never run and don't plan on doing so until the zombie apocalypse comes (just you wait), then working your way to a full 5kms is a great way to challenge yourself. Designed specifically for beginners, Couch to 5K Runner is an 8-week program (the free version includes the first 4 workouts to help get you started) consisting of 30 minute workouts, three times a week.



[IOS]
moo-Q
Free
www.hungrymindlab.com/moo-q/

Different people work best at different times of the day – some love to rise early, while others enjoy burning the oil into the early hours of the next morning. Knowing when you are your most productive can mean the difference between writing a page and a novel. Funded by the British Academy and supported by the University of London, moo-Q helps determine when your brain works best. Over a period of a few days you'll be asked to check-in with the app to answer a few simple questions, along with perform tasks associated with memory and processing speed. After you've completed a few, you'll be able to see a graph charting your mood and brainpower at different times of the day.



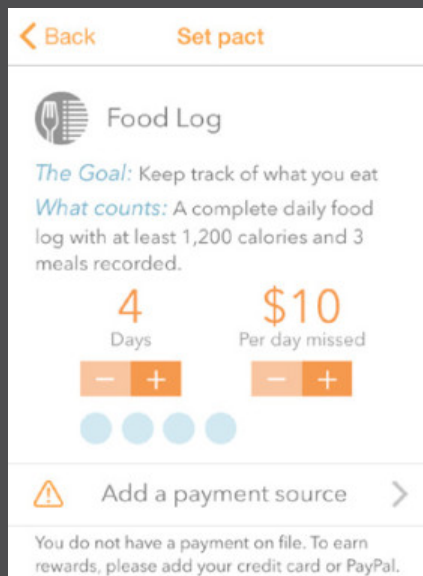
[IOS, ANDROID (COMING SOON)]
Streaks
\$4.99
streaksapp.com

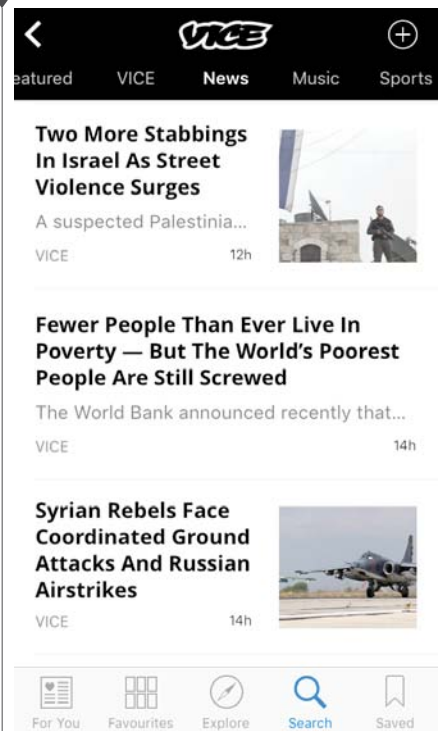
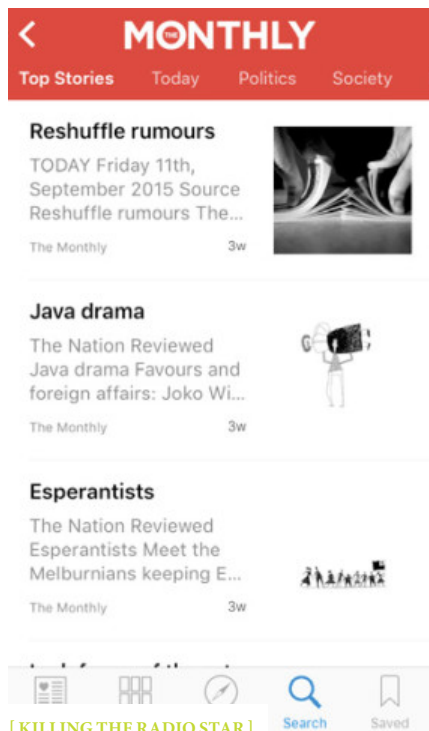
Performing mundane and repetitive tasks requires a quick and easy way to keep track of them. Whether it's walking the dog, going to the gym, or just brushing your teeth, Streaks enables the tracking of up to six different activities, with an extremely intuitive interface making marking them off is as simple as a quick press and hold. Linking with your phone's health app, Streaks can even keep track of fitness-related goals automatically, like walking 10,000 steps or the scarier, more daunting task of actually logging your weight. Tasks can be customised by colour, image and days needed to be completed, while reminders can be set to encourage you to accomplish them throughout your day.



[IOS, ANDROID]
PACT
Free
www.gym-pact.com

If the weekly fee you pay to go to the gym doesn't guilt you enough into exercising, then how about an app that actually rewards you for moving? Pact offers you a monetary incentive for actually going to the gym, while penalising you if you don't. Begin by setting a weekly health goal, such as exercising a certain number of days or eating more healthily. The app will then monitor your progress – using your phone's GPS for gym check-ins; motion tracking for running; or linking to services like MyFitnessPal to log food. At the end of the week you can see whether you've achieved your goal, along with how much you've earned (or lost) – with the money coming directly from those failing to reach their targets. ■





Apple News

A BROWSER BLOCKADE AND THE DEATH OF RSS.

[JOEL BURGESS]



[IOS]
Apple News
CRITICAL SPECS
Free | Available from iOS 9.1
apple.com/news

WITH APPLE'S LONGSTANDING history of success in digital music distribution, the launch of Apple Music was seen as a fairly big deal. Still, considering the most successful tech company in the world was launching its answer to the future of music consumption, the public and media's responses were somewhat restrained. It's perhaps not that surprising then, that excitement for Apple News — the company's first foray into the media space set to be embedded in the upcoming iOS 9.1 — was eclipsed by the numerous other announcements Apple made at its annual press conference in June.

But Apple News — which amalgamates news from a list of sources into one personally-customised, cleanly laid-out space — is definitely worthy of this month's Killer app award, not just because it could be game-changing for the online news landscape, but because Apple may be more qualified than you think when it comes to digital magazines and newspapers.

RSS readers became prevalent largely because of their practicality, allowing someone to effectively scan specific categories of hundreds of different websites in just minutes, but even the leading software in this space makes the task look more like work than the

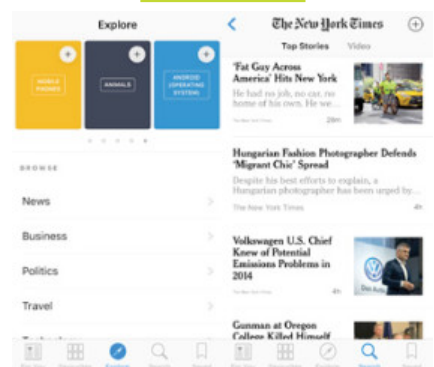
'entertainment' that news and magazines are supposed to represent. While Apple News is heavily influenced by other RSS readers, it's also taken a leaf from nicer looking magazine apps like Flipboard and Zinio by including pictures next to each of the headlines.

The stories are stacked vertically with a 10-to-15 word heading sitting neatly beside a square cover image, and you can scroll over about three stories at once, quickly reading the headlines or tapping through to explore the article in more depth. Tapping through to an article will expand it into a simplified format that's been specifically designed to be easy to read on an iOS device, though Apple has also put a bit of work into allowing more icons, fonts and links than your average pared-back RSS reader.

When reading an article you have tabs at the bottom of the story providing options to share, like or save the article, but Apple News is still missing the ability to swipe left and right to mark-as-read or share.

Though the Apple News app interface could perhaps be a bit better, it was still in beta at the time of writing and the problems that need addressing can be handled with relatively quick updates. What makes this app really stand out is its ease of use, combined with a good selection of quality news sources and topics you can choose from. Everything from The Guardian to Vice is presented with simple and appealing icons that can be added to your favourites list or each perused in their entirety.

APPLE NEWS — WHICH AMALGAMATES NEWS FROM A LIST OF SOURCES INTO ONE PERSONALLY-CUSTOMISED, CLEANLY LAID-OUT SPACE — IS DEFINITELY WORTHY OF THIS MONTH'S KILLER APP AWARD.



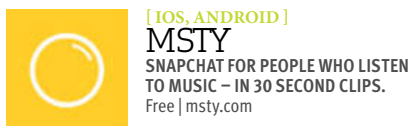
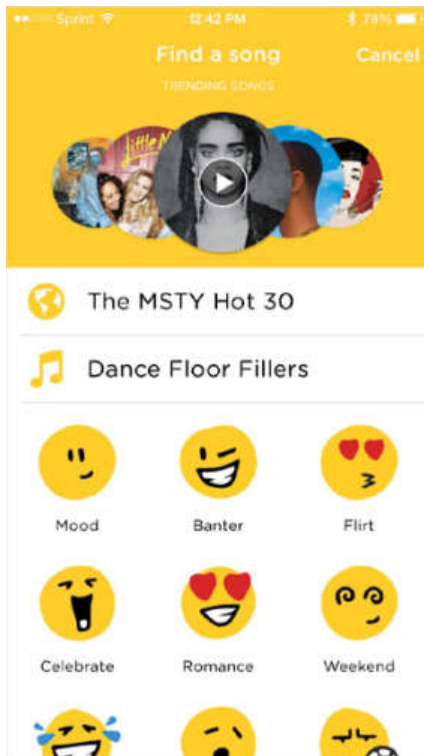
The surprising amount of local Aussie news already on Apple News is likely due to the Cupertino company's announcement that it will allow advertising blockers to function on Safari in iOS for the first time — something that is sure to motivate online news publications to pursue other avenues in order to advertise to readers.

Though a couple of ad-blockers have been removed from the App Store for pervasively blocking ads within native apps (like Apple News), many prevail, effectively allowing Apple to funnel any media businesses that rely on advertising onto its own platforms. Seeing as RSS readers and magazine apps rise and fall on content, Apple News may quite literally become a killer app, killing off all the competition. ■

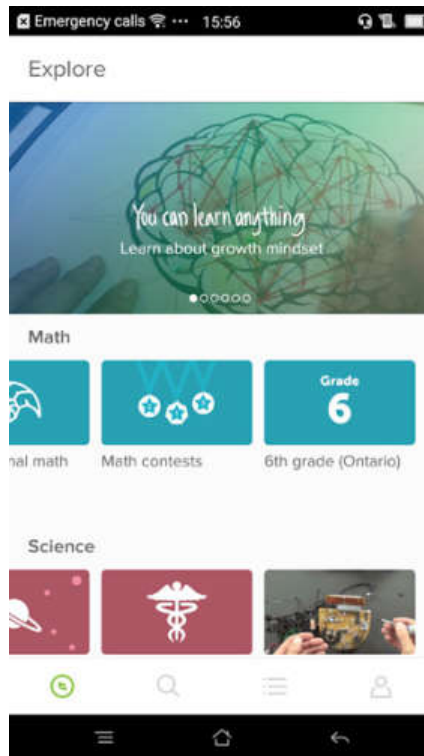
[LATEST APPS]

Magnificent new multiplatform apps

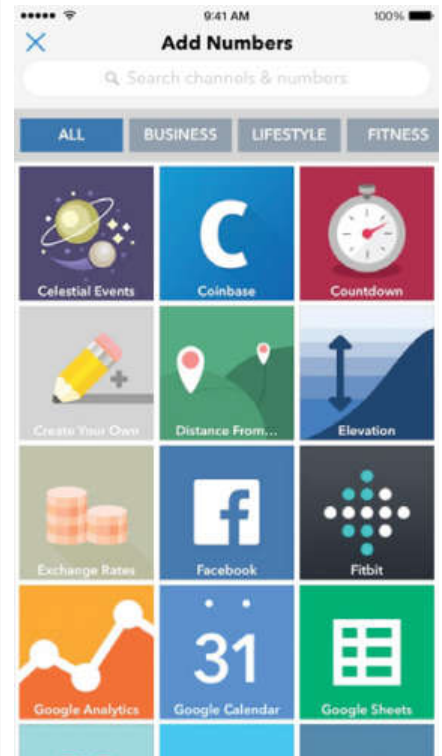
THE *TECHLIFE* TEAM UNCOVERS THE BEST NEW PLATFORM-AGNOSTIC APPS FOR ANDROID AND IOS.



For anyone over the age of let's say, 25, the SnapChat phenomenon is probably a bit puzzling. Why would anyone want to send short, disposable video messages to their friends? The answer to that question is blowing in the wind, but the point is, they do, so why not try that with music instead of blurry moving selfies? Why not indeed. That's what MSTY purports to do, and it does it fine, so long as you can find something you like in its slightly tiny library (around 2,000 songs at present). You simply select a song, or a 30-second clip of a song, append a message and send it off to a friend. They'll marvel at the profundity of your missive and hopefully send something back. I can actually see the appeal of this – insofar as I can vaguely see the appeal of SnapChat – but MSTY will need to accrue a better library before the likes of me get heavily involved. Dylan discography perhaps? Or the Star Wars theme? That'd come in handy. [SP]

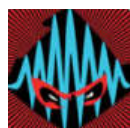
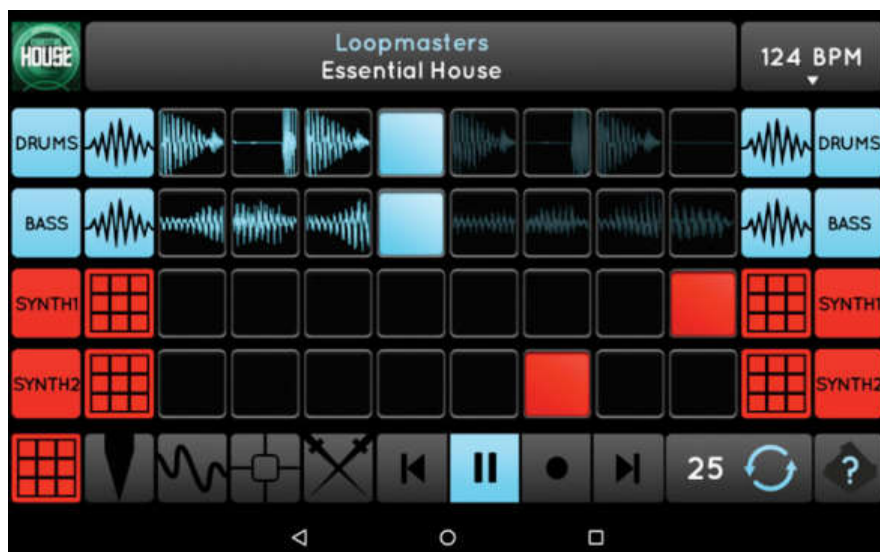
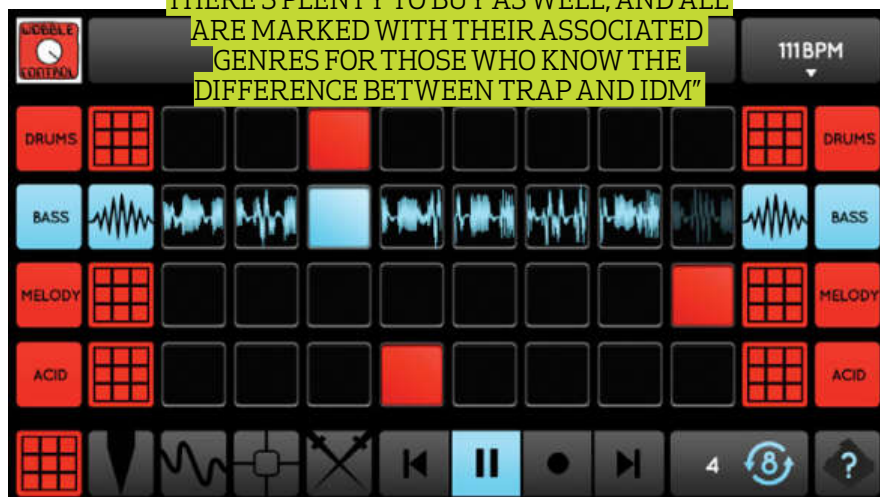


The Khan Academy is a non-profit organization founded in 2006 to provide a concise education platform that's open to the whole world and free of charge. With a new app under its belt, the video lecture series has been categorised into disciplines ranging primary to university level. Though initially housing mainly mathematics tutorials intended for friends and family, the academy has garnered support and funding from the likes of the Bill and Melinda Gates Foundation, the Lemann Foundation and Google, to name a few, and since then has expanded to cover science, economics and arts subjects. The app itself is well laid-out, with each subject adorned with its own colour-coded icon, while lectures are dispensed at the level you'd expect of a traditional university. If you want to expand your knowledge on a topic, it might be worth perusing the Kahn Academy's free library first. If you're just into learning new things, this is a fantastic place to start. [JB]



Where would we be without numbers? Probably still in caves and maybe even eating rats alive. Humankind has latched onto the allure of quantifying things with renewed fervour since the advent of smart devices, and Numerous aims to make your busywork/obsession a bit more streamlined. It drags numbers kicking and screaming from popular apps such as Stripe, Salesforce and the Google eco-system, as well as most relevant fitness apps like Apple Health, Fitbit and others. The library is constantly evolving, but the important part is how all these numbers are presented, and if you're sick and tired of tapping then Numerous does away with that strenuous task. You can choose to allow your numbers to be shared with others and there's a lot of flexibility with the way you can customise notifications. You can even set it up to perform actions based on your numbers: air conditioner integration being the most obvious boon here. [SP]

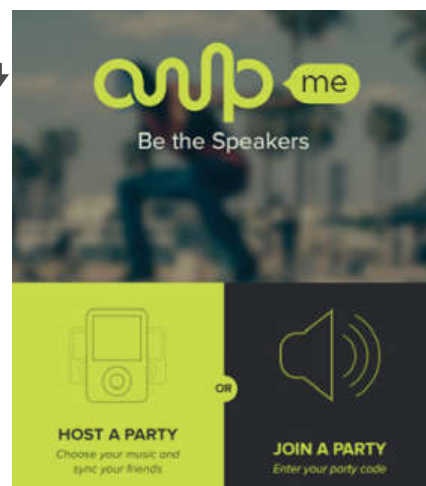
“THE APP COMES WITH A RANGE OF FREE SAMPLE AND LOOP PACKS FROM THE LIKES OF COLDCUT AND ROOTS MANUVA, BUT THERE’S PLENTY TO BUY AS WELL, AND ALL ARE MARKED WITH THEIR ASSOCIATED GENRES FOR THOSE WHO KNOW THE DIFFERENCE BETWEEN TRAP AND IDM”



[ANDROID AND IOS]
Ninja Jamm
A COMPELLING MUSIC-MAKING TOOL
FROM A PRESTIGIOUS DANCE LABEL.
Free | www.ninjjamm.com

Why listen to other people’s music when you can make your own? No one’s ever asked that question, but Ninja Jamm has answered it anyway with a pretty fun and flexible tool for making your own dance music – though it’s more of a toy than an app. Prestigious dance label Ninja Tune provides samples, effects and more, allowing you to do with them what you wish across four tracks. The app comes with a range of free sample and loop packs from the likes of Coldcut and Roots Manuva, but there’s

plenty to buy as well (ranging from \$1.20 through to the \$4 mark), and all are marked with their associated genres for those who know the difference between trap and IDM. Don’t expect to be the next EDM superstar, but if you dig the music in Ninja Tune’s impressive catalogue and like mucking around in Garageband, this is a nifty little, um, game? It’s kinda like a game, really, but it’s a surprisingly powerful one. [SP]



[PLATFORMS]
AMPME
DAISYCHAIN YOUR PHONE’S SPEAKERS.
Free | ampme.com

If you’re hanging out with friends in an outdoor setting but no one brought a decent portable speaker, you have to be pretty desperate to try using your smartphone’s inbuilt speakers -- but if you want to play some tunes, what else can you do, right? Well, with the new AmpMe app, not having a dedicated speaker might not be such a big issue. AmpMe is a multiplatform app that lets multiple Android or iOS devices connect with one another, peer-to-peer style, to play songs in sync. This means that each app-connected device can act as a speaker in a potentially-unending daisy chain of music. Unfortunately, at the moment you’re can only play tunes streamed from Soundcloud, and we found the connection itself could be pretty flakey. But with a few tweaks, this new offering could become the life of the (ad-hoc) party. [JB]



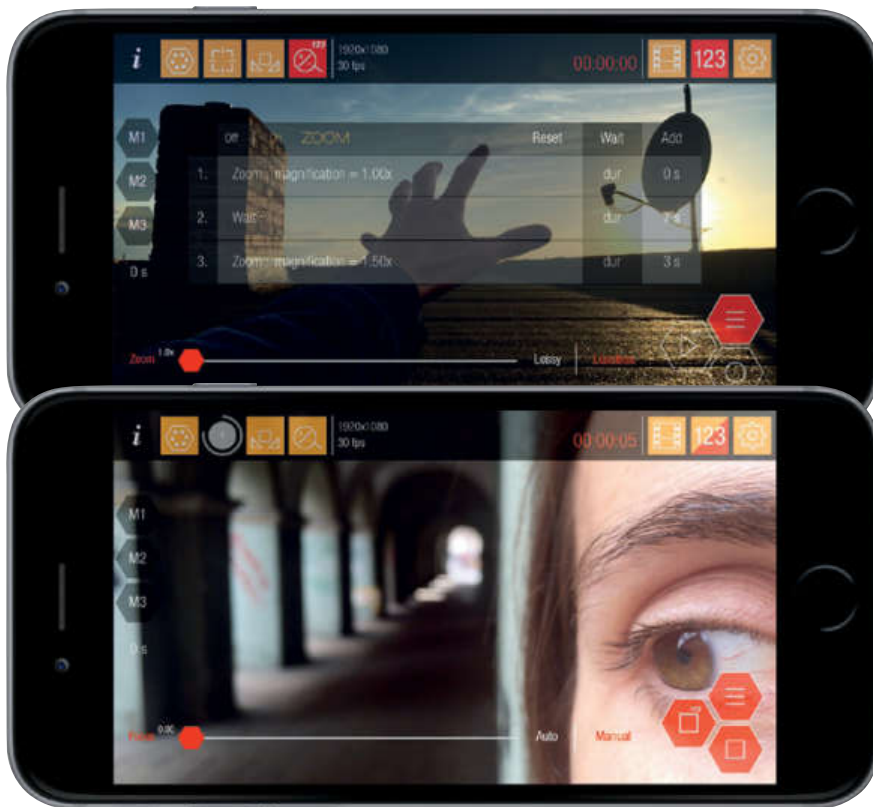
[PLATFORMS]
NUSIKI
SOCIAL MEDIA’S ANSWER FOR FINDING
NEW MUSIC.
Free | nusiki.com/#/

This social media app is designed for the sole purpose of finding and sharing new music, and it turns out it’s pretty good at it. The first thing that’s striking about Nusiki is the design. In many ways it borrows elements that work in existing social media platforms, but with a muted grey and white colour scheme it looks edgy and appealing. After setting up an account and finding any friends that might be on the platform already, you’re able to skim a news feed of followers or explore the posts of other prolific users on the app. From here you can like, comment or share the music that others post in a familiar and easy-to-use manner. Another point of difference is the search function. Obviously you’re going to want to add some tracks to your new profile, and Nusiki taps into YouTube and Soundcloud when you search for music, refining search results to just tracks or music clips that you can post directly to your page. It is a well fleshed-out app and one worth downloading for active music hunters. [JB]

[LATEST APPS]

Impressive new apps for iOS

THE LATEST MUST-HAVE APPS FOR YOUR iPhone AND iPad!



[IOS]
Guerilla Filmmaker
UNLOCK YOUR INNER KUBRICK WITH YOUR IPHONE.
\$4.99 | gfm-app.com

The best camera, they say, is the one you have in your hand. With this in mind Sotcha has created the Guerrilla Filmmaker app, and it's actually rather good. It unlocks manual options for the otherwise automatic features of your iPhone's video mode – such as focus – though it's not the first app to do that. But that's actually just the beginning.

Yes, manually controlling the focus with a slider to create rack-focus-style shots is both easy to do and extremely satisfying, but it's the programmable keyframe feature that makes this app so cool and potentially useful.

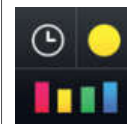
All the manual features can be programmed to change their values at pre-designated intervals. That means if you have a tracking shot and want to pull focus between two focal

planes you can program your focus shift, hit record and let the app worry about hitting the marks.

For filmmakers, this is a truly amazing feature and one that many professional cameramen would wish their pro cameras had built in. Which, come to think of it, they should do.

This programmable function is pretty easy to use and, like the rest of the interface, is reasonably well designed and intuitive. Menus are dragged in and out of view with swipes and, when expanded, the manual controls appear as simple sliders.

That said, it's not perfect. There's no manual aperture control so depth of field is locked; and, though the icons look good, it would be nice to have more of a real-world interface that would be instantly recognizable to a video professional or DSLR owner. Still, Guerrilla Filmmaker represents superb value for money and real potential for smartphone-loving indie filmmakers. [ALUN PUGHE]



[IOS]
STATUS BOARD
STOP YOUR IPAD GETTING BORED BY DISPLAYING STATUSES.
Free with IAP | panic.com/statusboard

Status Board enables you to arrange a number of customizable panels, which, when activated, turn your iPad into a display that details all kinds of information. For free, you get panels for clocks, weather, calendars, email, Twitter and RSS feeds. Pay \$9.99 and you can add tables, DIY HTML, graphs, countdowns and custom text. Smartly, photo albums are part of the paid offering, which we suspect will tempt many to upgrade.

Even for free Status Board is a great download, giving your iPad a reason to exist when you're not using it. The panels look great, although be wary of the built-in wallpapers, which too often obscure on-screen text; and while we found some aspects of editing a touch fussy, it's easy enough to get everything up and running.

For businesses, it's potentially an even better install. Boards can be shared as set-ups or stills, and you can enable subscriptions, so everyone's always got the latest version. [CRAIG GRANNELL]



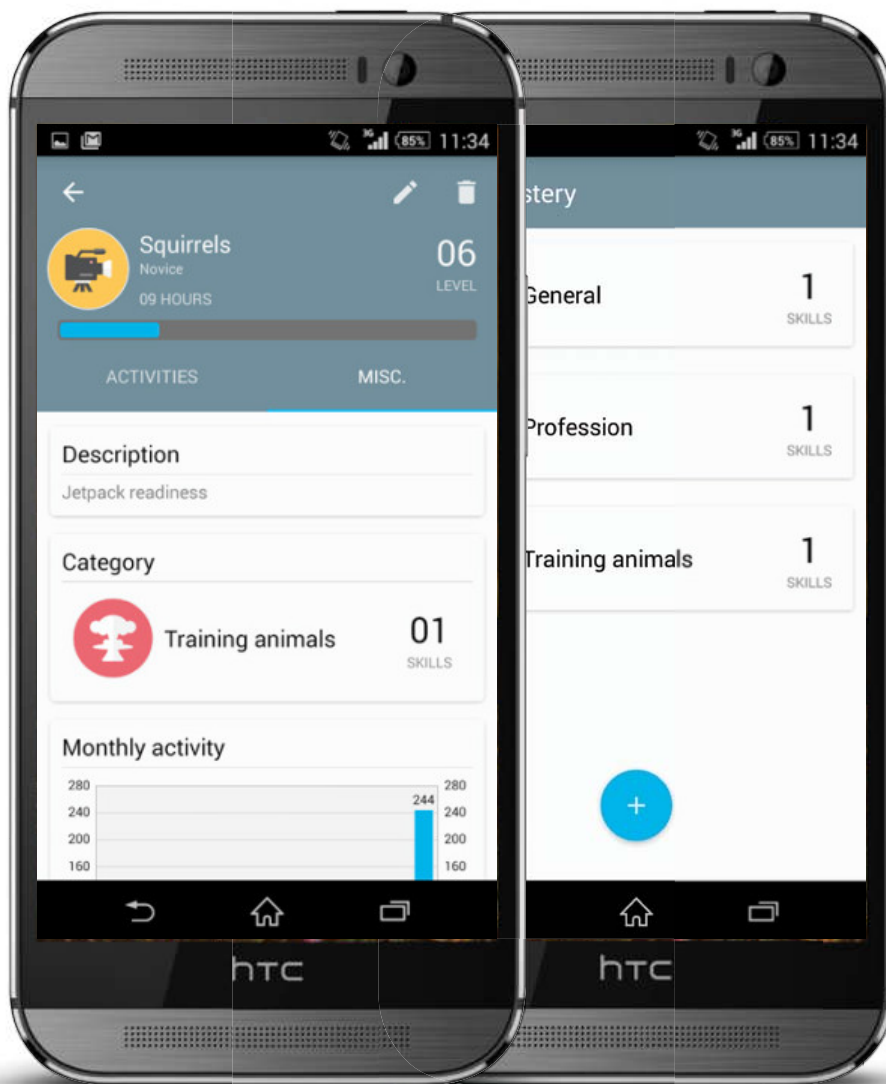
[IOS]
FRAGMENT
NOT YOUR EVERYDAY IMAGE FILTERING APP.
\$2.49 | pixiteapps.com

Rather than making your images look like they've been left in a biscuit tin for 40 years, Fragment uses a geometric shape to split and duplicate the shot, creating a kind of double exposure.

Flicking up the menu allows you to switch the shape you're playing with, as well as brightness, contrast, glow colour and even a stereoscopic 3D effect. It's the sort of thing you could spend hours playing with, and while it will repay the time you invest in it, sometimes the best results come from a simple application of the prism-like shards the app is capable of generating.

The effects are certainly striking, but a lot rests on choosing the right combination of filter and base image. Once you've found something that might work, you can zoom and rotate the inset image with your fingers before tapping an arrow to either share your creation or run it back through the app to apply a different filter.

The decision to use a swipe up from the bottom of the screen to open the filter menu is an odd one, as it's quite possible to open iOS's Control Center instead. Otherwise, Fragment has an intuitive interface that's speedy to operate. [IAN EVENDEN]



[LATEST APPS]

Agile new apps for Android

WE DIG UP THE HOTTEST NEW APPS FOR ANDROID PHONES AND TABLETS.

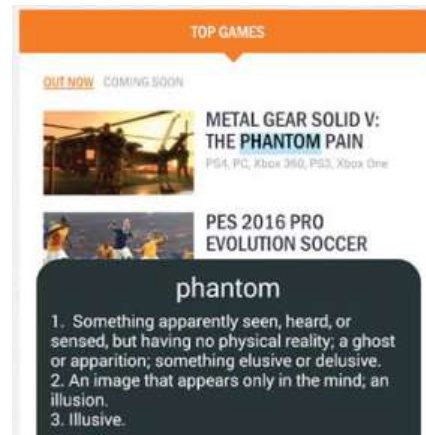


[ANDROID]
Mastery
IN FOR THE SKILL.
Free | tinyurl.com/tla44-mast

There's a saying that it takes 10,000 hours of practice to be a master of something. Mastery essentially acts as a time-keeper so you know exactly how long you're spending to be the absolute best at your chosen activity. The app is quite free-form at the moment, leaving it up to you to plug in your desired subjects, and at first it seems to double-up on headings and skills -- there's also no tutorial, so you'll possibly spend an hour figuring out how to label your activities. There's a wide range of

customised icons, so you can easily glance at what you want to perfect. A handy graph also shows off how much time you've spent on your various tasks, and it's satisfying to see those vertical bars climb higher and higher. It's not all work, either: you can set yourself rewards, with 'coins' that can be cashed in for something of your choosing. Sure, the app requires discipline and a lot of initial input, but stick with it and you'll succeed.

[PAUL TAYLOR]



[ANDROID]
INSTADICT
QUICK DICTIONARY DEFINITIONS AT THE SHAKE OF A PHONE.
Free | tinyurl.com/tla44-insta

The instructions couldn't be clearer. Select a word in any app, copy it, shake your phone, and Instadict supplies the definition in an easy to read pane at the bottom of your screen. While Chrome offers an ability to search for words, it always needs to have an internet connection, pulls you away from what you're reading, and, well, it's only available in Chrome. Instadict is offline compatible, and keeps the screen open on what you're reading. There are compromises though. Its definitions are pulled from Wiktionary and some are extremely brief. Nor do they cover all word forms, and its presentation is inconsistent as some words with multiple uses have definitions for nouns, verbs and adjectives, most don't. However, as a quick go-to tool, it's a very clever and simple concept. Plus, it has a small footprint: the offline dictionary is under 18MB, and the app itself is a piddling 1.1MB. Now if only you could do that with magazines... [PAUL TAYLOR]



[ANDROID]
MOVE TO IOS
TRADING PLACES.
Free | tinyurl.com/tla44-move

So, you've decided to swap platforms from Android to iOS and are looking for the easiest way possible to transfer everything from your old handset to your new iPhone? You've found it -- sort of. While this app does a fine job of holding your hand all the way through the process (which should be less than the amount of time it takes to make and then consume a cup of tea), it will throw a slew of confirmation text boxes your way, asking you to re-enter your passwords on your old and new devices, over and over. That annoyance aside, it's simple to get started: join the same Wi-Fi network on both phones, start the app, and you're on your way, porting photos, text messages, and accounts. Simple. But, if you have everything synced to the cloud, the only really useful function of the app is copying text messages. And, you still have to redownload all of your apps -- well, those that are available on iOS anyway. Still, if you want a one-stop solution for going from Mountain View to Cupertino, this is your best bet.

[PAUL TAYLOR]

[LATEST APPS]

Wicked new apps for Windows Phone

GET THE BEST NEW APPS FOR YOUR MICROSOFT-DRIVEN SMARTPHONE.



[WINDOWS PHONE]
Pocket Rally
SO GOOD IT MIGHT MAKE YOU SICK.
\$1.19 | tinyurl.com/TLA44-PktRa

This rally game is definitely one of the better driving titles we've come across on the Windows Phone Store. Using the touchscreen to accelerate and brake and the smartphone's orientation to turn the car, the simple controls are easy to comprehend but difficult to master.

The first few rounds are a little tricky to overcome, but as you get used to the timing of the steering and when to use the throttle, that learning curve thankfully flattens off a bit.

Powered by the Unity engine, the graphics aren't too bad either with impressive looking rally-cars and realistic-but-simple backgrounds adding up to make the core experience a visually enjoyable one. The game can get a bit repetitive, as there are only eight playable cars and eight tracks, but the minimalist approach has also allowed the game to focus on the level design and integrate subtly difficult obstacles into each raceway.

The challenges fluctuate between single lap, double lap and opponent time trials and will make you do each track in various cars. For \$1.19 this is an entertaining game that'll keep you occupied for hours.

[JOEL BURGESS]



[WINDOWS PHONE]
INSTABULLET

SHOOT FILES BETWEEN DEVICES.
Free; \$1.59 | tinyurl.com/tla44-inbul

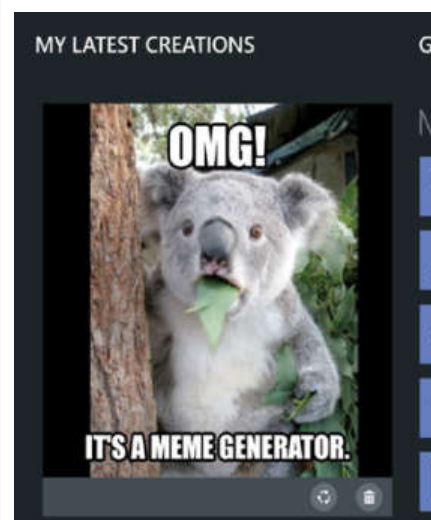
There isn't an official Pushbullet app for Windows Phone yet, but there's no shortage of third-party apps that offer one of Pushbullet's most sought-after features: flicking files back and forth between devices. Instabullet is an unofficial Pushbullet client that differentiates itself by claiming to have better file syncing than the competition. As a whole, Instabullet stacks up pretty well against other unofficial Pushbullet clients, but it still lacks some of the features found in the official Android and iOS versions. You can log into your Pushbullet account through Instabullet, but there's no way to set up a Windows Phone device on a Pushbullet account and push files directly to it — you'll have to upload files to your Pushbullet cloud and pull them down through Instabullet later. If you don't have Dropbox and just need to flick files between your computer and Windows Phone then this isn't a bad option, but an official Pushbullet app would be better. [JB]



[WINDOWS PHONE]
MEME GENERATOR SUITE

DON'T SAY THE POPE IS DOPE IN SPAIN.
Free | twitter.com/MemeGenSuite

The things that end up going viral on the internet are varied and unpredictable, but if you want to have a good crack at making your own web sensation, having a meme generator could be a decent way to earn some online kudos. Meme Generator Suite is a free app with a paid Pro tier that allows you to quickly make memes from an enormous selection of new and popular images, or using your own photos from your smartphone. You can also tap into the massive archive of memes on memegenerator.net by searching for specific images using the site's database. The editing page allows you to tweak the size, colour and positioning of text on a template image and then quickly share it through a number of compatible social apps. Although you'll mostly need to have a data connection to use it, the app also allows access to a number of background images while offline, so you won't miss a chance to insert your social commentary — even if you're out of reception. [JOEL BURGESS]





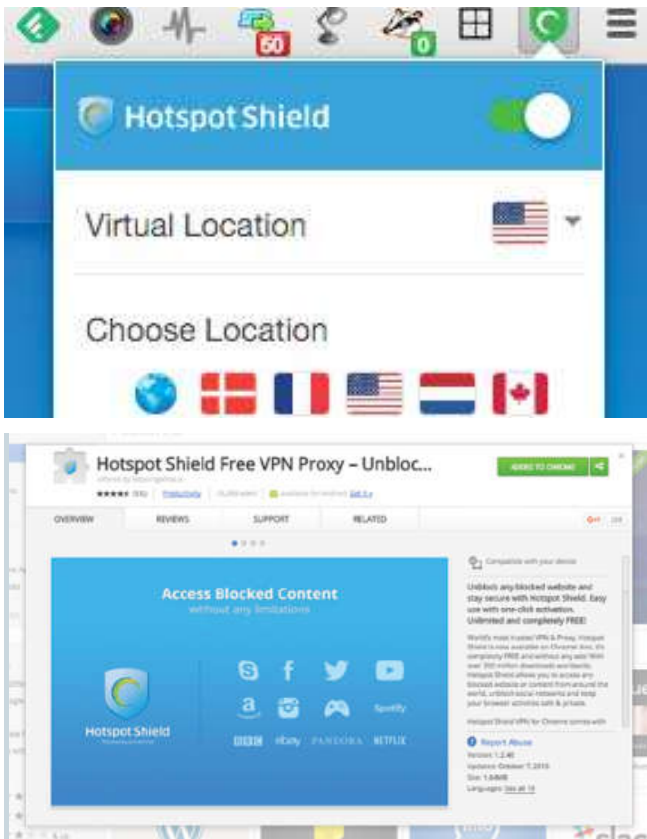
The home of technology

techradar.com

[BEST APPS]

Unearthed

THE **TECHLIFE** TEAM'S FAVOURITE NEW SITES, SERVICES, BROWSER PLUGINS & OTHER HANDY TOOLS.



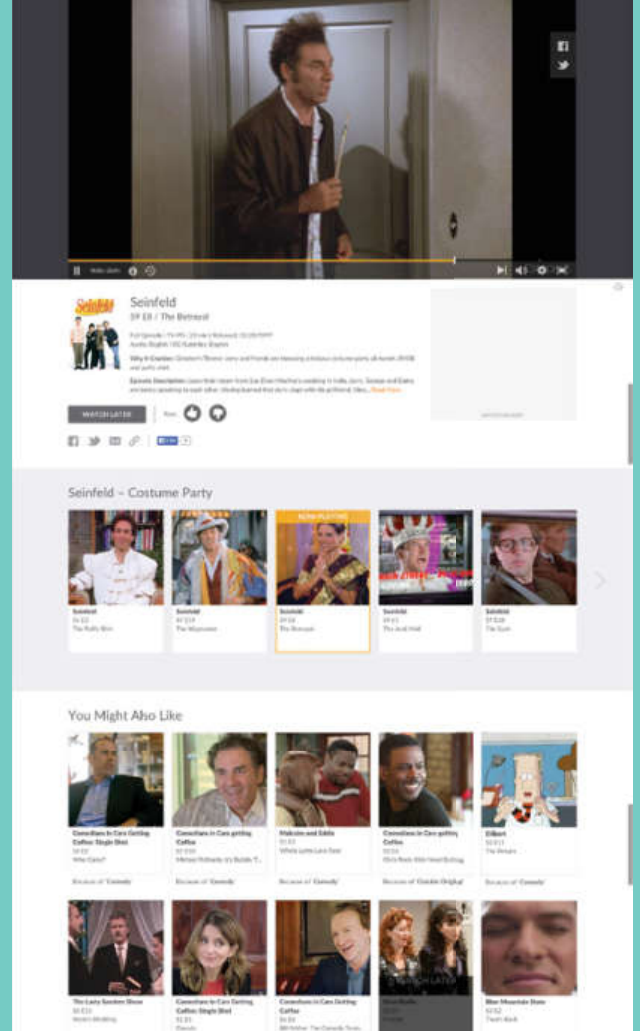
[BROWSER EXTENSION]

Hotspot Shield Free VPN Proxy

GET THE HOLA OUTTA HERE.

Free | gethss.io

There are lots of ways to get around geoblocks these days, but most of the good ones require you to sign up for some sort of subscription, which can set you back anywhere between \$3 to \$15 or more a month. Of the free options, we've previously highlighted Hola Unblocker as being an option, but earlier this year it was exposed as being a little dodgy (it's essentially a peer-to-peer VPN, but it's one that can use your bandwidth without your knowledge — including for commercial use), and while it's not actively malware, we'd still suggest giving it a wide berth. A better alternative is this new Hotspot Shield VPN browser plugin (available for Firefox and Chrome); while Hotspot Shield has been around as a free program for what seems like forever, this new option makes it much easier and quicker to turn on and off when you need it. Even demanding tasks like media streaming work OK. Want to switch to the US version of Netflix for access to the wider array of shows? Just flick open Hotspot Shield's control panel, change your local to the US and turn the VPN on. You might have to wait a minute for a stream to actually start playing, but once it's going we didn't experience any skips. You can also use it if you're on public Wi-Fi to help protect you from potential hacks. This is a fantastic free tool that everyone should have in their browser.



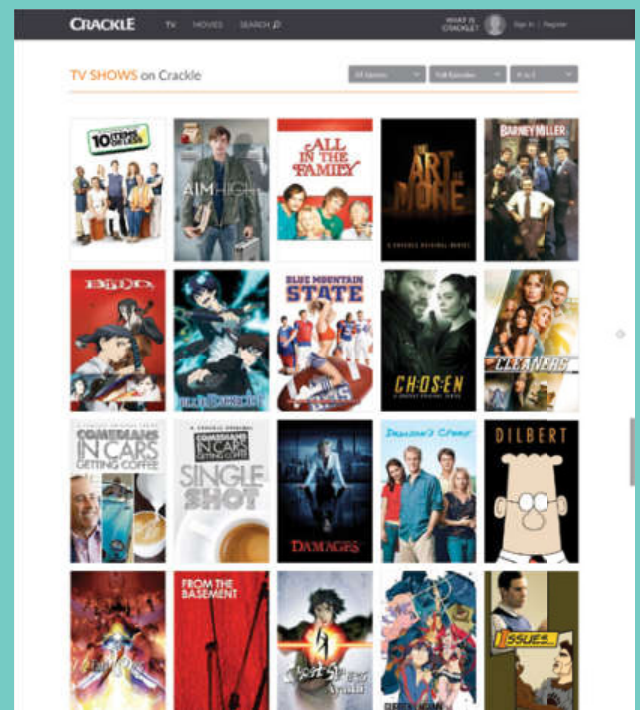
[WEBSITE]

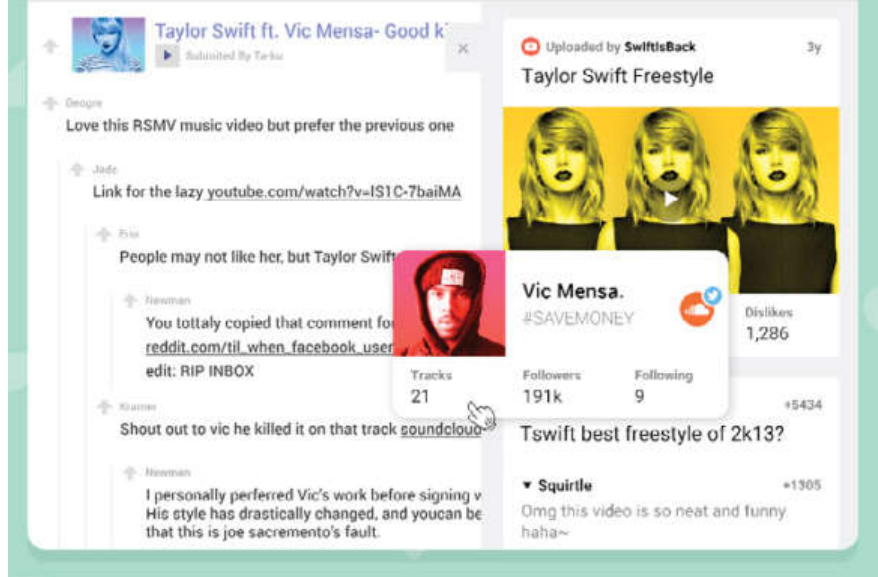
Crackle

FREE MOVIE AND TV STREAMING — AND IT'S TOTALLY LEGIT.

Free | www.crackle.com

Crackle is a Sony Pictures'-backed free video streaming site that's been available for some time — it's ostensibly ad-supported and aimed at a US audience. That means that in Australia, there's only a fairly limited variety of shows and movies on offer — most of them not really mainstream Hollywood fare, with the exception of a few movies and what looks like nearly every episode of *Days of Our Lives* for the last two decades. Hmmmm. However, use the site in combination with Hotspot Shield (left) and you'll get access to all the US content, ie. things that you actually want to watch. Now if you'll excuse me, I'm off to binge-watch every episode of *Seinfeld* back to back. Somebody pass the pretzels.





[BROWSER EXTENSION]

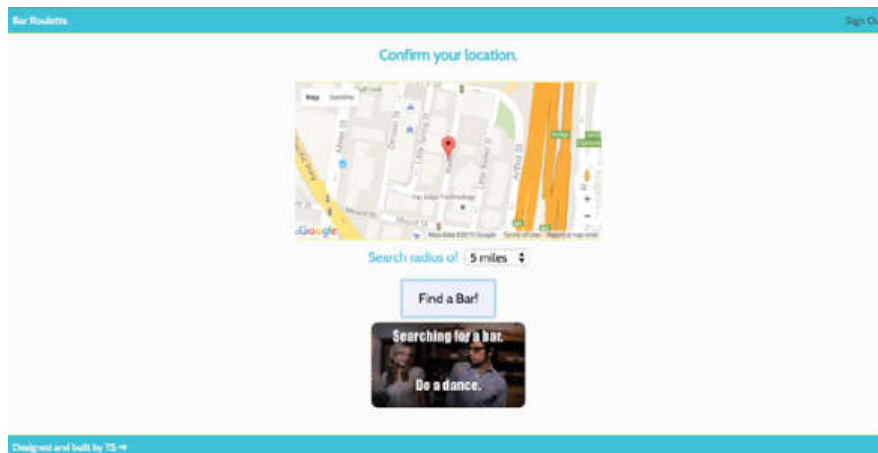
Hovercards

STATE IT, PANE.

Free | www.hovercards.com

Clicking is so last decade — too permanent, too much risk. Hovering is the way forward. This Chrome extension cuts the annoying barrier (the click) between a link and what's on the other side on a number of social media sites, including Youtube, Twitter, Reddit, Soundcloud, Imgur and Instagram. Rather than leaving the tab you're in, simply just mouse-over the link and Hovercards displays a small window that gives you an idea of what you can expect on the other end. In practice, it's a little bit like the preview pane on Facebook that turns

a jumbled link into a picture with some preview text — useful to get a snapshot of an Instagram user, for example. Once you have an idea, you can then click on the preview pane (don't worry, it doesn't actually take you to another page or site) for a summary of the comments on the page, which is ideal if you want to see the conversation on Reddit without actually going there. With all that info in hand, you may now click if you wish... or hover off to something else. [PAUL TAYLOR]



[COMPANION APP]

Bar Roulette

ROLL THE DICE ON A NIGHT OUT.

Free | bar-roulette.herokuapp.com

Have you ever been keen to keep a night-out-with-friends going, but when it came to picking the place to go you were all stumped? Finding a nearby drinking hole can simply be a matter of walking around for a bit, but chances are the best ones will be right under your nose... and you'll never actually cross paths with them unless you hear about them on the grapevine. Bar Roulette may just be the solution to this common problem. A little less consequential than the Russian version of roulette — though similarly suspenseful — Bar Roulette plugs into your Uber account and then scours Yelp

reviews of bars that are rated well in the vicinity, plucking out one of the best at random. Using a customisable radius setting (usually 5km) the app won't consider anything on the other side of the city. Once it lands on something nearby, it'll even hail an Uber for you, automatically giving the pickup and dropoff details to the driver — but the twist is that Bar Roulette won't divulge the destination to you until you're out of the cab. It's a simple way to tumble down a city's rabbit hole — if you're into that. [JOEL BURGESS]

[WWW.TECHLIFE.NET]



[WEB SITE]

EAT THIS MUCH

THE MEAL DEAL.

Free | www.eatthismuch.com

We're in an age of information, but often the hardest task is knowing how to practically apply it. Eat This Much takes that philosophy and turns it to your daily food planner. Plug in some stats, activity levels, your target weight and so on, and the site spits out a menu for the day ahead, filled with exact details regarding calories, carbs, fat, sugar — the lot — with no sign-in necessary. From here, you can then customise how much protein, carbohydrates and fat you want in those meals, refresh, and you'll find something new. What's clever is that it's not simply geared towards people who want to lose weight, but those who want to maintain or even bulk up. If you do sign up for an account, it'll cost US\$9 per month if you go month to month, or US\$84 for the year. In return, the site promises it'll send you a shopping list for a week's worth of meals. Even if you're completely happy with your health and fitness levels, we love that the site's also extremely useful for providing inspiration for meals. Tired of eggs on toast? Give protein oatmeal pancakes a go. [PAUL TAYLOR]

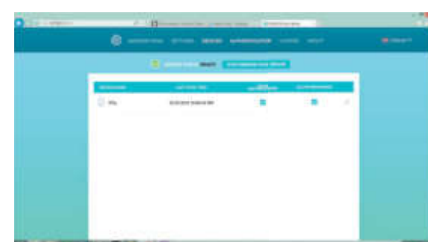
[CROSS-PLATFORM APP]

DAEMON SYNC

A FIENDISHLY USEFUL SMARTPHONE BACKUP APP.

Free | daemon-tools.cc/products/daemonsync

Now, an app with 'daemon' in its title may not be all that comforting to the computer lamen — just like all those mysterious, evil-named applications that you see running in the background of your computer when you're checking Task Manager — but in tech-talk a daemon is simply software that runs on its own, without the need for commands from a user. When you realise that Daemon Sync is an app that will back-up your Android or iOS device to your computer over Wi-Fi, the concept of it running all-by-itself starts to make a little more sense. After downloading the the server app to your Linux, Mac or Windows PC and loading the Daemon Sync app onto your Android or iOS device, the app is easy to get up and running. There's no logins or passwords, just type a four-digit code (generated locally by your PC) into your smartphone and you can sync your media and any other folders you wish to your computer. This connection will be established automatically whenever you enter the local Wi-Fi area and you can set your device to automatically sync at specified intervals. [JOEL BURGESS]



Weather conditions throw in some wild cards, but it's not dynamic.

[GAMES]

Straight-laced racer

REVIEWS OF THE HOTTEST NEW GAMES ON PC AND CONSOLES, INCLUDING WEIRD MARIO AND UNDERWATER HORROR.



Forza Motorsport 6

STILL TOP OF CLASS RACING,
BUT IT DOESN'T INNOVATE.

\$99.95 | XO

www.forzamotorsport.net



IF YOU'RE ANYTHING less than a petrolhead, *Forza Motorsport 6*'s presentation may seem a tiny bit perverse. With an opening cutscene that positions driving cars as equal with the meaning of life or finding god, the game's assumption that every player is invested in the more fetishistic tendencies of the automobile industry is outright tedious. Couple that with the game's *Top Gear* announcers and its constant pushing of brand names (you can even rack up 'affinity' with certain brands that you interact with more in-game) and *Forza 6* sometimes feels like one long advertisement for itself.

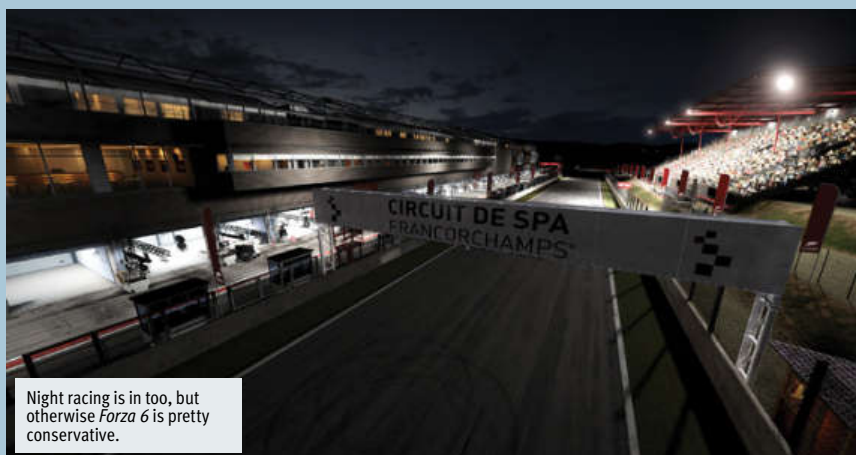
So it's bloody lucky the game itself is as near perfect as a circuit-based racing sim gets, at least once you get past the tutorials and turn the music permanently off. The improvements over *Forza 5* are immediately obvious and abundant: the graphics are better and the 60fps frame rate is unswerving (compare the Prague track in 5 with 6's for the best visual comparison). The cynical microtransactions of *Forza 5* are gone, and the user interface is much improved. And while it may not boast dynamic weather or the anal retentive

attention-to-detail found in *Project Cars*, it's hard to deny that *Forza 6* – for the vast majority of us, at least – is a lot more fun than the other po-faced sims on the market.

While *Forza Horizon 2*'s showcase races are back – discreet novelty races that let players into hotted-up cars early without strictly owning them – it's relatively easy to accrue fancy cars in the game's career mode. In fact, *Forza 6* ladles gratification in the form of frequent 'wheel spins', or random lotteries rewarding anything from XP to luxury cars. This generous outlay of new stuff gives the career mode momentum, though having to finish in the top three in order to progress might seem old-fashioned to some. (For me, that's what makes this a race.)

For series veterans though, only the mod packs are likely to feel genuinely new. These allow the player to modify the conditions of any given race, usually by upping the difficulty in exchange for the promise of better rewards. Oh, and it'd be remiss not to mention the online component: like *Forza 5*, your friends will be present in-game at all times thanks to habit-aping Drivatar AI, but the real online multiplayer remains largely unchanged compared to its predecessor: in other words, it still works. And that's about the best you can say about *Forza 6* overall – it's still head of the class in the racing sim stakes, but it's not reinventing the series nor genre. It doesn't really need to.

[SHAUN PRESCOTT]



Night racing is in too, but otherwise *Forza 6* is pretty conservative.



An efficient blend of crime scene and funeral.

Shadowrun: Hong Kong

THE GAME OF DOWNLOADS AND DRAGONS TELLS ITS DARKEST TALE YET, IN THE HARSH NEON GLARE OF HONG KONG.

US\$19.99 | PC, Mac, Linux | harebrained-schemes.com

SPLICING MAGIC WITH a not-so-far future Earth ruled by megacorps is inherently ridiculous, but *Shadowrun Returns* was nonetheless a tad dry. *Hong Kong*, its sequel, is blessed by the camp excess of Eastern cinema, not just in the lurid neon that adorns every shopfront, but in the clichéd retorts, triad wars and B-movie heists that it seems to delight in. It's like the series has relaxed, convinced by a third successful Kickstarter that it's good at what it does.

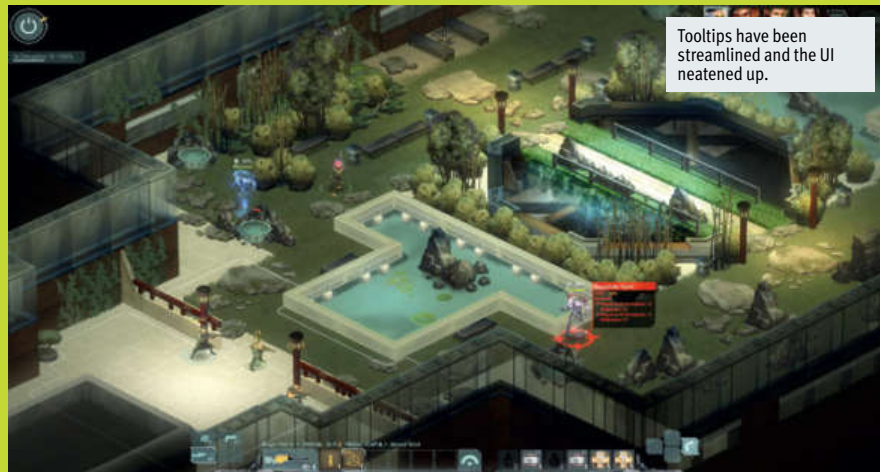
Shadowrun is about intrigue above all, and the central narrative here raises questions aplenty. There's the staple murder mystery, Hollywood backstabbing, impromptu feng shui and some casual tomb raiding to keep things fresh. Of course, this being *Shadowrun*, these all take place through clicks on static interactive icons, the scene-setting handled by text and décor alone and the reliable turn-based combat all but unchanged. No doubt more-of-the-same seemed safer than experimentation, but in the face of competitors

like *Pillars of Eternity*, *Shadowrun* needs to adapt or end up looking dated.

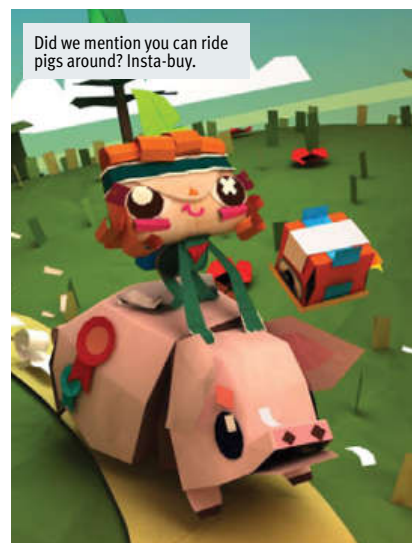
It's a shame the crowdfunded \$1.2m wasn't enough to resolve the longstanding interface woes. The UI is cleaner, but a certain amount of patience is required to see past input lag and, on one occasion, complete failure that caused my runner to stroll about in sleeping gas instead of taking the lift. I left her behind with vindictive pleasure. And for all the quality of *Hong Kong*'s dialogue, it's more an illusion of player choice than meaningful roleplay. Polite, smartass and slow-witted options typically mask the same response.

Regardless, this is a spectacular story of deceit and poisonous evil that will lure you through the most indulgent settings yet seen in the RPG renaissance. For the price, it's of giddy scale, but *Shadowrun* is starting to cry out for innovation. If it continues to tread water, it could end up slipping back into the shadows.

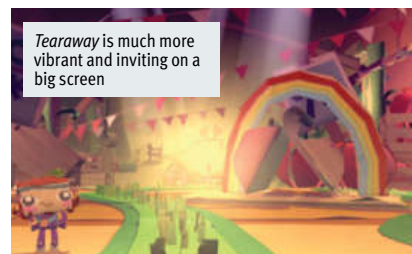
[ANGUS MORRISON]



Tooltips have been streamlined and the UI neaten up.



Did we mention you can ride pigs around? Insta-buy.



Tearaway is much more vibrant and inviting on a big screen

TEARAWAY UNFOLDED

LOSES A BIT IN TRANSLATION, BUT STILL AN ESSENTIAL PLATFORMER.

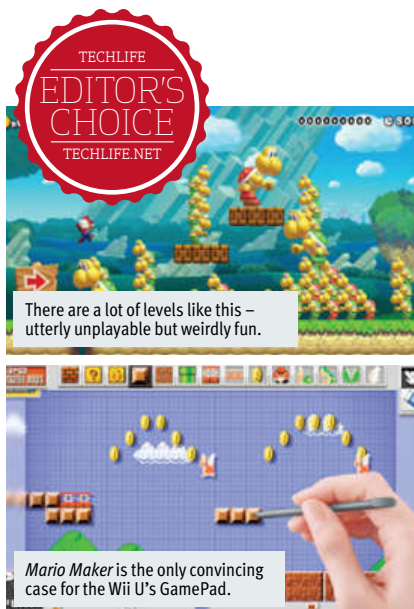
Tearaway originally released as a PlayStation Vita exclusive – a handheld receiving little-to-no ongoing support by Sony. As a result, the company is salvaging the Vita's best titles via heavily-upgraded PS4 reissues, and *Tearaway Unfolded* is among the first to get this treatment. (Vita title *Gravity Rush* is also coming to PS4 next year).

Tearaway is Media Molecule's attempt at the 3D platformer, but given the studio's pedigree (it created *LittleBigPlanet*) it's also a little unorthodox. Originally reliant on the Vita's streamlined touch interface, *Unfolded* demonstrated both the advantages and shortcomings of translating to the big screen. The more creative elements, such as manipulating the gameworld, is more finicky using the PS4's touchpad compared to the Vita's spacious touchscreen. Meanwhile, you'll need a PlayStation Camera to gain access to some of the more advanced creative features.

As a straightforward 3D platformer though, *Tearaway* gains more from the PS4 than it loses. It's bigger and more beautiful on a television screen, its colours more vibrant and world more intricate. No matter which platform, *Tearaway* ought not be ignored.

[SHAUN PRESCOTT]

\$54.95 | PS4 | tearaway.
mediamolecule.com



There are a lot of levels like this – utterly unplayable but weirdly fun.

Mario Maker is the only convincing case for the Wii U's GamePad.

SUPER MARIO MAKER

THE BEST CASE FOR USER-GENERATED CONTENT IN GAMES, BUT ALSO THE WEIRDEST.

Super Mario Maker was arguably the best video game ever made before it even released. As a mere concept it's the greatest game ever made. Picture this: eleven giant Goombas emerging from a green pipe right above Mario's spawn point. A giant trapped Bowser harried by hundreds of self-bouncing trampolines. A level that's just one thwomp suspended over an eerie abyss. Luigi suffers a midlife crisis, related by golden coins. This is *Mario Maker*: it's ten years of Nintendo fever dreams brought to life.

Miyamoto would never pull these moves, but in *Mario Maker* everyone is doing it. With a built-in level maker, thousands of players are uploading thousands of stupid *Mario* courses every day, and while few of them are actually good – and maybe only a small handful actually brilliant – the mere fact of them existing is its own reward, because *Mario Maker* feels like an alternate reality. In which crazy parallel world would the traditionally protective Nintendo allow this to happen? In which spectral universe would Miyamoto let you play as a Goomba? Welcome to *Mario Maker*, the weirdest game on the planet.

Level design is a simple drag and drop affair, and it's relatively easy to create and playtest your courses on the fly. You start with 10 upload slots, and gaining stars unlocks more. At the time of writing, gaining stars (done so when someone signals they've enjoyed your course) is very difficult: the economy is weighted in favour of early adopters and, weirdly, autorun levels where you don't actually 'play' at all, and making a dent in the already crowded scene is tough.

Still, just playing with other people's abominable experiments is fun enough, because even poor level design can't ruin the simple joy of Mario's movement, or the cheerfulness of the entire enterprise. And there are loads of great levels out there – ranging in difficulty and craziness – but you'll need to do some searching to find them. And the search is the funnest part of *Mario Maker* – it's like sifting through the wreckage of a generation's misspent youth. [SHAUN PRESCOTT]

From \$79.95 | Wii U
supermariomaker.
nintendo.com



That's not even the worst thing you'll see.

Soma

THINGS ARE NOT BETTER UNDER THE SEA.

\$42.95 | PS4, PC
www.somagame.com

4

IN THE BROADEST of strokes, *Soma* sees you trapped on an underwater research base, and desperately trying not to be. Much of the game involves navigating uninviting corridors trying to escape. While the trailers pushed a more action-oriented stealth/horror vibe, avoiding monsters is only a small part of the mix, and actually its weakest facet. Instead of predatory fiends hunting you down, these creatures are lumbering patrollers, mindlessly wandering a set route in a small area – usually blocking your path to either a thing or a door you need to reach. The solution is always to lead them away, then loop back, and the predictable behaviour means it's an element that's not as scary as we'd hoped, despite a few jumpy moments.

There are also only five or six such encounters in the whole ten-hour play time, so it's a problem that's relatively easy to overlook. The weight of the experience really comes from exploring both the base and the story – piecing together what's actually happened, or solving puzzles to progress. There's a

marvellously tactile feel to the world, with the right trigger and stick used to grab and manipulate objects. It's a simple gimmick but there's something satisfying about manually pulling open drawers and yanking on wires. This physicality is reflected too in the game's refreshingly grounded puzzles, each based in real-world logic. This is a game with no pings, updating objective markers, or any other traditional guidance, meaning you actually have to look around and figure out what you need to use.

The real pay-off to *Soma*, though, is completing its story. As you push deeper into all the things we can't really talk about, it gets brilliantly unpleasant, worming concepts and realisations into your brain that don't play well with your happy place. At least one decision made us actually detest the developer for forcing it on us, while the final resolution is the kind of thing that will haunt you for years to come. In a good way.

[LEON HURLEY]



These chairs play an important role.



The detail in the city is remarkable.



Combat lacks the satisfying weight of *XCOM*.

Satellite Reign

ENJOY OPEN-ENDED CYBERPUNK STRATEGY ON THE RAINY NEON STREETS.

US\$39.99 | PC, Mac, Linux | www.satellitereign.com

THE RAIN NEVER stops falling on *Satellite Reign*'s isometric future-city. It's derivative of countless cyberpunk cityscapes, but amazingly atmospheric regardless. Video ads cycle on huge billboards, reflected in puddles on the pavement below. Police drones float past, spotlights scanning for trouble. It's like *Blade Runner* if Ridley Scott had filmed it with a tilt-shift lens.

It's in this dystopian urban sprawl that you, owner of a small corporation with big ideas, must make your mark – which is easier said than done when the mega-corporations and their military-grade security forces have a monopoly on everything. Starting in the downtown area – a bustling, labyrinthine world of neon – your path through this open-world city is the one you carve. You can do missions in any order, in any way you please.

The action is viewed from above, and you control your four customisable super-agents with traditional RTS controls. It's reminiscent of *XCOM: Enemy Unknown*, but real-time rather than turn-based. Your guys can dash into cover, and their accuracy in a gunfight is determined by range and weapon, enemy position, and by their abilities – which can, of course, be upgraded. You can flank enemies to get the jump on them, snipe from afar, or charge in for a melee attack.

But while games like *XCOM* and *Shadowrun* limit you to closed-in levels,

Satellite Reign's open city lets you seamlessly move from the anonymity of the streets, where you can hide in the bustle, to a mission: attacking a rival corporation's factory or robbing a bank. These guarded spaces are levels of a sort, but they sit in the open world waiting to be attacked or infiltrated.

It's daunting at first. The starting area is enormous, and there's so much intricate detail on those maze-like streets that you can feel lost. It's when you see a thick wall, gun-toting guards, and warnings to stay away that you know you've encountered somewhere you can assault or rob, and that's when the game gets really good.

My biggest complaint is how the game feels. It has none of the kinetic weight of *XCOM* or *StarCraft*, which top-down games like this need to compensate for your distance from the action. Your agents' movement is slow and heavy, making the battles feel sluggish. It's a hard thing to articulate in words: it just lacks that slickness that many of its peers have.

This is an issue that haunts every moment of the game, but otherwise, *Satellite Reign* is one of the most enjoyable small-squad strategy games I've played in ages. I love how it blends tactical combat with an open-world structure. Creeping through a heavily defended enemy base unseen is a thrill, and if things go awry, there are plenty of combat options to experiment with.

[ANDY KELLY]



Save energy cells to lob ship-based special weapons.



Picking up cases mid-battle earns you more supplies.

SKYSHINE'S BEDLAM

UNFORGIVING AND AS HARD AS NAILS, THIS POST-APOCALYPTIC ROGUELIKE IS A ROAD TRIP THROUGH HELL.

Skyshine's Bedlam is a turn-based roguelike about taking risks and making hard choices. Everything has a cost. Stopping to speak with travellers will cost fuel, food, and days on the road. Finding out that they're insane robots will cost my soldiers a dead comrade and days in hospital. Choosing to drive past them would have lost me hundreds of gallons of precious crude oil.

The map and the choices made there are *Bedlam*'s ruthless balancing act: driving costs fuel; transporting crew costs food; your soldiers have to fight to restock. If you run out of anything essential, the expedition is over. The more days tick by, the more dangerous the wastes become.

There's a second, less successful half to *Bedlam*. Every fight that breaks out on the map screen is played out on an isometric grid. Casualties are to be expected, and that's where *Bedlam* runs into the most trouble. I found it so completely impossible to escape from a battle unharmed – even when I enjoyed a total victory – that empty barracks doomed my expedition more often than any other cause. *Bedlam* is a game of warring incentives: explore opportunities for supplies at the expense of a dwindling roster of doomed young people.

XCOM also features permadeath, and also thrives on the sense of danger that accompanies every conflict, but no matter how bad things get, there are always more recruits. The worldwide *XCOM* project doesn't end because of an unlucky grenade throw. In *Bedlam*, dead soldiers end the journey. For me, this is where the game crossed the line from enjoyably brutal to stressful frustration.

[IAN BIRNBAUM]

US\$19.99 | PC
www.gobedlam.com

Moments later, this man was attached to a balloon and sent into the sky. Because MGSV is weird.

STEVEN 'BAJO' O'DONNELL

is a video game critic and co-host of ABC shows *Good Game* and *Good Game Spawn Point*. His love of games is only surpassed by his love of cats.

[SNEAK, SNEAK, SNEAK, PLOT, PLOT, PLOT]

Let's get sneaky

AS HUMANS WE ARE PROGRAMMED TO TAKE THE PATH OF LEAST RESISTANCE. EVEN IF THAT MEANS STABBING, GARROTING, OR APPLYING A LIGHT TASER TO EVERY GOON ALONG WAY.

[STEVEN 'BAJO' O'DONNELL]

I WOULDN'T SAY stealth games are the most popular genre. They are in essence, strategy games and they're also hard to get right. It takes a particular mix of mechanics and ideas to make a stealth game great. A combination of variety, flexibility and punishment. A true, pure stealth game won't let you stab or shoot your way out of every situation. If you've ever played the original *Thief* series and been spotted by a guard, you'll be more than familiar with what true fear feels like. Those encounters were so

scrappy and scary, you had about a 50/50 chance to get out alive. The way it should be!

Stealth games are also usually slow and methodical, which suits the kind of gamer who likes to make a plan, execute it perfectly, and abort when things go to hell. And there's a real balancing act for developers when designing a sneaky game. The recent trend was to always let you have the option to 'run and gun'. I get why developers do this, so they're more accessible. But giving us the action hero option takes away

from the overall sneaky experience. It's just not as satisfying to stealth until you're busted, then just become a mass murderer.

The key factor of any great stealth game is the artificial intelligence of goons. Enemies need to be predictable, but not appear to be. Usually, guards walk in a loop, with plenty of opportunities for you to take cover and wait for your backstab chance. It pulls you out of the moment when you notice such obvious patterns. The trick for designers is making AI



WHAT TO PLAY

2015 HAS ALSO BEEN A GREAT YEAR FOR STEALTH GAMES IN GENERAL, ESPECIALLY ON THE INDIE SCENE. HERE ARE SOME WORTH CHECKING OUT.

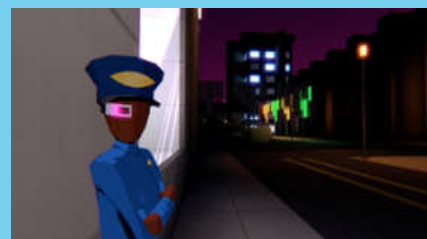
INVISIBLE, INC.

Invisible, Inc. is one of the best tactical turn-based strategy games of late. The art style and presentation is elegant, and it's both accessible and deep at the same time. Hard to fault.



SATELLITE REIGN

Satellite Reign is a cyberpunk real time strategy game, and a spiritual successor to the much loved *Syndicate* series. It's locally developed in Brisbane by Five Lives studios who have done an incredible job with this ambitious game.



NEON STRICT

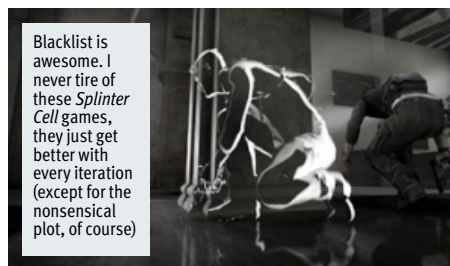
In *Neon Strict* you play an ex-spy, out to clear your name. The game's minimalist art style makes it unique, and there's an intriguing story to get wrapped up in. A fantastic sound track too.



First thing they should teach in goon school – check the closet. Always.



No other stealth game plays with costumes like *Hitman*.



Blacklist is awesome. I never tire of these *Splinter Cell* games, they just get better with every iteration (except for the nonsensical plot, of course)



Conviction was a more personal story for Sam, as he investigated his daughter's death. They used some interesting techniques to display your objective on the world around you. An expected highlight in the series to date.

which seems like they're just going about their business, but also predictable enough for you to plan an attack. There's a few good ways to do this, mostly through subtle variety, and progressive difficulty in the enemy setups. Each enemy you face can't be designed as a unique encounter because that inconsistency will confuse the player. Also, I would guess that it's not practical from a programming point of view either. But when games add just a touch of variation, in dialogue or placement, it can keep players on their toes and engaged in the idea of hiding in the shadows. I bang on a lot about *Hitman : Absolution* whenever I get the chance, and it makes sense to mention it here because it does all this so well.

But, the *Splinter Cell* series is the master when it comes to creating stealth set ups that force you

to use the tools you've learned, and adapt on the fly. Sure, you often have so many gadgets that using them all is nearly impossible. And the plot of nearly every SC game is full of geo-political white noise (and often terrible acting).

But the series manages to hit that tone of encouraging perfect stealth runs. And they do it without offering you much reward. It's more about the principal of the thing! What I find most interesting about stealth games, is when they shame you into restarting. After all, you're meant to be role playing a super cool stealth

covert undercover assassin, and there's nothing more depressing than getting a D on your report card when the mission is over. I wish games shamed us more. Shame is a powerful motivator, and a tool that video games are uniquely able to wield.

If you're in the mood to catch up on some AAA stealth games which are still fantastic to play through today, I recommend the following: *Hitman : Absolution*, *Splinter Cell : Conviction*, *Splinter Cell : Blacklist*, *Assassins Creed 2*, *Assassins Creed Black Flag*, *Dishonoured*. ■



VOLUME

Volume is from the maker of the heartfelt indie geometric platformer *Thomas Was Alone*. It's a pure stealth game, all about avoiding combat. It's not an overly difficult stealth game, but there's well designed progression as you move through the levels, faced with new challenges and gadgets to play with. The hook with this game, is you can play user created levels instead of the main campaign, and they still weave the story through that content. Clever!



RONIN

Ronin is an action stealth game. This twist with *Ronin*, is that it's also a 2D platformer, and turn based! It's very similar to 2013's *Gunpoint* (another one worth checking out!). In fact, the developer himself has pretty much stated *Ronin* is a 'Gunpoint rip off'.



METAL GEAR SOLID V

Metal Gear Solid V is the latest in this long running and uber popular series. It's a big game. It's an action game, or a stealth game. But the stealth is the most rewarding way to play, especially because you can approach bases in an open world, anyway you like. The story is indulgent, the constant stream of credits a little arrogant, and there's a fair bit of female sexual objectification with 'Quiet', the games only notable female character. But, if you can get past that, it's kind of a masterpiece and there's nothing else like it.



[MOBILE GAMES]

Go-getter

THE TECHLIFE TEAM REVIEW THE LATEST GAMES FOR MOBILES AND TABLETS, INCLUDING LARA CROFT'S MOBILE DEBUT.



[ANDROID, IOS]
LARA CROFT GO
TAKING TOMB RAIDING DOWN
A NEW PATH.
\$6.49 | www.laracroftgo.com

COMPARED TO LARA Croft's typical tomb-raiding adventures, the methodically paced *Lara Croft GO* might seem a bit limiting. However, while it's definitely not as fully featured as its PC and console brethren, the title manages to include everything that Ms. Croft is known for – action, exploration, combat, and puzzles – while making it better suited for quick hits of touch-screen-controlled gaming on your iOS device.

Similar to Square Enix's previously released *Hitman GO*, *Lara Croft GO* eschews real-time gameplay for a turn-based affair. Your movements are restricted to grid-like paths within the levels, and the controls never get any more complex than swiping to move from one spot to the next or tapping to interact.

Many actions, in fact, are automatic, such as picking up items and attacking nearby foes. Everything is very deliberate; enemies and obstacles (such as boulders and saw blades) only move when you do, resulting in a cerebral affair that favors careful planning over quick reflexes.

Nonetheless, the game is extremely satisfying thanks to creative level design and excellent pacing, and the adventuring never grows stale due to increasingly complex elements — including crumbling floors, movable platforms,

pressure switches, and pushable blocks – that put your puzzle-solving skills to the test.

Each enemy features distinct behavioral patterns, too, that require you to use the terrain and your brain to defeat them (or in some cases, manipulate them to your advantage) to get through the game's approximately 75 puzzles. There's even a rather epic turn-based boss battle of sorts toward the end.

The difficulty is spot-on as well. A few areas might bewilder at first, but that makes victory all the sweeter when you have that "Aha!" moment and figure out how to proceed. Should you find yourself resorting to trial and error, generous checkpoints ensure that you won't be frustrated, even in defeat.

Of course, there are the obligatory collectables too. Dozens of hidden gems and artifact pieces will test your powers of observation, and acquiring full sets unlocks new costumes for Lara. Even though it doesn't provide the kind of adrenaline-fueled action fans might associate with the current Lara Croft, it's an excellent puzzle adventure. [CHRIS HOFFMAN]

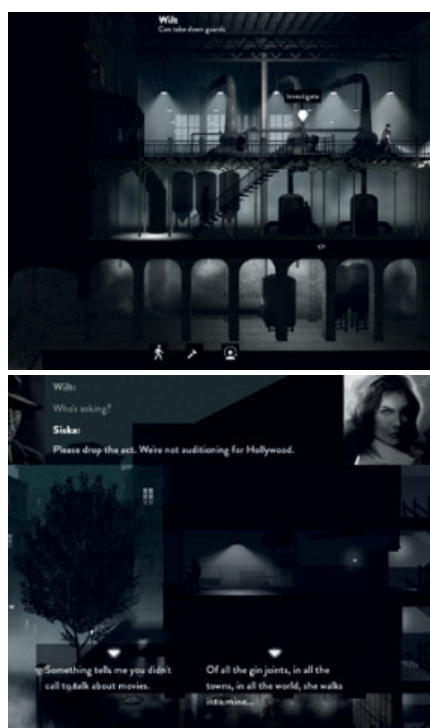


[IOS, ANDROID COMING SOON]
HORIZON CHASE
A RETRO RACER THAT'S DEFINITELY
WORTH CHASING DOWN.
\$3.79 | www.horizonchase.com

Channeling the vibe of 1980s and 90s arcade racing classics like *Out Run*, *Test Drive* and *Top Gear*, this fast-paced and vibrantly-coloured driving game takes you from golden-hued Californian deserts to LA's nighttime streetscapes and far beyond as you take a world-tour of locales. *Horizon Chase* is basically the polar opposite of EA's *Real Racing* franchise — there are no real-world tracks or cars here, just simple stylised graphics, an insane sense of speed and corners that are always taken as one long skid, with the 'wheel' slammed as far to the left or right as it will go. Play is relatively forgiving but does demand you pay attention. Look away from the screen for a second and you risk missing a turn or bumping into the back of someone you're trying to overtake. While you won't need to spend hours learning tracks or mastering car handling, but you will often need to retry races in order to place first. There's also a ton of additional cars and upgrades to unlock (all done by just placing highly in new tracks) and races generally last from 2-3 minutes, making it perfect for quick play sessions. If you enjoy racing games in the slightest, put the pedal to the metal and pick this one up; it's one of the best mobile games we've ever played.

[DAN GARDINER]

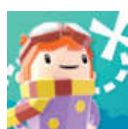




[IOS, PC, PS4]
CALVINO NOIR
A BLACK AND WHITE GAME THAT'S
JUST A BIT... GRAY.
\$4.99 | mcro.org/calvinonoir

Many games go for a noir feel, but few pull it off successfully, often just putting any old detective story in monochrome and calling it a day. *Calvino Noir* is one of the better attempts at hitting that atmosphere – not just its rain-soaked black-and-white stylings, which plays with 3D perspective and light to great effect, but also its cast of characters of questionable trustworthiness and motivations. The actual game involves sneaking Wilt through 2D scrolling levels, avoiding detection while investigating suspicious doings. Control is handled with a kind of point-and-click interface, and this is *Calvino Noir*'s main stumbling block. Moving multiple characters around a level means a lot of switching and tapping, and in carefully timed stealth sections, it's often clumsy and irritating. There are many parts of levels that are a pain to get past without dying, rather than fun or empowering. At times, it's fine, but too often it feels like work.

The story (which you get a third of for the price – the rest through IAPs) comes in dialog dotted throughout levels, fully voice acted and with some multiple choice responses for Wilt – but it tries way too hard to be “hard-boiled,” leaving us rolling our eyes at both the lines and their delivery. [MATT BOLTON]



[IOS]
LAND SLIDERS
NOM NOM SOCKS.
Free | prettygreat.com

We're playing as a squat, white tumble dryer sliding around a floating island in search of blue and red socks that probably belong to Spiderman. The partially fenced extremities of the grassy, procedurally-generated map fall away into a cloud-lined abyss and though it may seem idyllic, this random landscape is far from being a safe-haven. We're followed by bears, angry bulls, an oblivious turtle wearing a spikey potted-cactus and a formidable T-Rex on a pogo stick, all of which will send us to white-goods-heaven if we let 'em. This chaotic setting is the island bedrock of *Land Sliders*, the first game to be pushed out of new Aussie indie studio Prettygreat. Prettygreat was founded by two former Halfbrick employees who have the likes of *Crossy Road*, *Fruit Ninja* and *Jetpack Joyride* under their belts, so it's not really that surprising that *Land Sliders* turned out as good (and as odd) as it has. And yes *Land Sliders* may look like a simple-enough high-score leaderboard chase, but the learning-curve is steep and there's an interesting array of unique worlds and unexpected elements that make for a novel and enjoyable experience.

[JOEL BURGESS]



[IOS]
SAGE SOLITAIRE
YOU DON'T HAVE TO BE A SAGE TO
ENJOY THIS SMART CARD GAME.
Free with IAP | www.sagesolitaire.com

Indie game designer Zach Gage has built-up a respected reputation thanks to his steady stream of clever mobile titles (including the excellent *SpellTower*, *Ridiculous Fishing* and *Halcyon*) and his unwillingness to be pinned down to just one genre. His latest creation is this single-player card game that combines solitaire with poker. As in regular solitaire, the objective is to get rid of all your cards, but you do so by creating poker-like hands — match a trio of sixes and you can discard all three cards, for example — with the ultimate objective just being to beat your previous high score. There's a button up the top that lets you quickly see what kinds of matches you can make (that includes two-, three- and four-of-a-kind, a full house and most kinds of straights and flushes) and games typically only take a few minutes. This one's very well presented both in terms of graphical polish and simplicity of play — and constantly creating matches does successfully tickle the right reward centres in your brain to keep you coming back. It doesn't hurt that it's free either, and you can put up with ads interspersed between games, or pay \$3.79 to get rid of them and unlock a couple of new game modes. A solidly enjoyable little time waster.

[DAN GARDINER]



TEST BENCH

THE HOTTEST GEAR PRESSURE-TESTED



[BARRIER-SMASHING]

The right stuff

THE TECHLIFE TEAM REVIEWS THE LATEST TECH PRODUCTS, STARTING WITH THE SPEEDIEST ROUTER WE'VE EVER TESTED.

Netgear Nighthawk X4S D7800

SERIOUSLY-IMPRESSIVE WI-FI PERFORMANCE AT A SLIGHTLY EYE-WATERING PRICE.

GIVEN THAT NETGEAR only just released its first 1,300Mbps 802.11ac ADSL router a few months back, this new 1,733Mbps 'Wave 2' model came as something of a surprise. It's not the first 'Wave 2' 802.11ac device to market (that was arguably ASUS's RT-AC87U router, which hit shelves earlier this year) but it is the first to have integrated ADSL... and that also perhaps helps explain its \$549 price tag.

Wave 2 is the next phase of 802.11ac Wi-Fi tech, and one which could ultimately see routers reaching 6.93Gbps transfer speeds — four times as fast as the 1.73Gbps in offer here. That'll require entirely new hardware however — this is more just a first step.

And it's really the high-end hardware in the D7800 that you're paying for here — in terms of software configuration options, they're exactly the same as other recent Netgear routers, including the D7000. What this new model adds is an extra 433Mbps of wireless bandwidth, helped along by a dedicated fourth antenna. Mind you, it's otherwise nearly identical to Netgear's other Nighthawks in terms of external design — some add-on ports have been shuffled around (there are two USB 3.0s for attaching storage or printers, plus a dedicated eSATA port), but you still get five Gigabit Ethernet ports in back and one for the ADSL/VDSL phone line.

Now, at present 1,733Mbps Wi-Fi is a bit of a pain in the butt to test — apart from the routers themselves, there are few devices that support this standard; it's not built into any smartphones or laptops, and you won't find a single USB dongle or even PCIe card to let you add it. We managed to secure an ASUS wireless bridge which does have 1,733Mbps (the EA-AC87), but we couldn't get it to play ball with the D7800 within our deadline.

The two devices connected fine, but the ASUS refused to let our test PC see any other devices on the local network — meaning we couldn't test transfer speeds. Even with that testing limitation, however, the D7800 offered some seriously impressive performance — particularly at longer distances. In tests of the latter, this one's dedicated 4T4R (four transmit and four receive) antenna setup help it blitz everything other 802.11ac router we've tested.

In our read test (pulling data from the router to a laptop) most of the competition manages speeds of 30-40MB/s. The D7800 blew past that at 52.9MB/s — only a few MB/s slower than our close-range test. Our write test was more in line with others however — 25.1MB/s, or basically average. What's more, those high speeds held up when we switched to 2.4GHz 802.11n — they were only marginally lower than close range, at

9.5/10.8MB/s for reads/writes respectively.

Also splendid was its very high sync speed — again the highest we've got on record at 17.8Mbps, a full megabit above our lower scorers, netting you roughly 100KB/s extra download speed.

The D7800 could be better in some respects, especially considering its whopping \$550 asking price. While it ticks all the basics (automatic or manual QoS, OpenVPN support, guest networks, dynamic DNS, external storage and so on) we would have like to have seen a more visual web interface alongside advanced per-user bandwidth controls — like what competing Fritz!Box devices offer. As it is, you can limit the entire network to a monthly data allowance, but not throttle or limit use for individual devices.

[DAN GARDINER]



NETGEAR NIGHTHAWK X4S D7800

\$549

www.netgear.com.au

CRITICAL SPECS

802.11b/g/n/ac Wi-Fi, ADSL 2+/VDSL modem, 4T4R antenna setup, 4 x Gigabit Ethernet ports, 2 x USB 3.0 ports, eSATA port, NBN ready



Oppo R7 Plus

BREAKING THE GLASS CEILING OF THE MID-RANGE SMARTPHONE.

THOUGH THE 6-INCH Oppo R7 Plus maintains the appealing shape and look of its smaller R7 sibling, there are quite a few features that make this bigger model a unique proposition that stands out in its own way. The most noticeable (apart from its much bigger size) is perhaps the movement of the Home, Back and Menu buttons; on the R7 they're physical and placed below the screen, while the Plus has software based ones contained on its touchscreen. But the upgrade that's even more significant is the addition of a rear-mounted fingerprint sensor, which sits underneath the rear camera meaning it's conveniently positioned to unlock the device your index finger. Oppo's latest Colour OS, which is essentially a tweaked version of Android 5.1, looks great on the 1080p AMOLED display, while the impressively thin bezels and polished metal case combine to give the phone a largely premium feel. And though you might expect this from your smartphone, it's not always the case for mid-level phones that go for \$599 — especially not phablets with 6-inch displays.

Performance wise, the R7 Plus is closer to where you'd expect from that price; it manages respectable benchmark scores for general tasks, but only just scrapes in when it comes to more intensive gaming tests. The Plus's Qualcomm Snapdragon 615 processor has two A53 quad-core ARM Cortex chips, one that runs at 1.7GHz and the other at 1.0GHz, to maximise efficiency without having to sacrifice performance in more demanding tasks. In combination with the Plus's huge 4100mAh Li-Po battery, this big phone still gets a 10.5-hour battery life and even allows close to 6 hours of continuous gaming.

If you're looking for a plus-sized phone without the supersized price tag, the Oppo R7 Plus is a serious contender in this middleweight division. [JOEL BURGESS]



OPPO R7 PLUS

\$599
oppo.com/au

CRITICAL SPECS

Colour OS 2.1, 6-inch 1,920 x 1,080 AMOLED display, Qualcomm Snapdragon 615 CPU, Adreno 405 GPU, 3GB RAM, 32GB storage, 4A VOOC charger can fully charge device in 107 minutes, microSD card slot, dual SIM support, 13MP rear and 8MP front-facing camera, 192g.



Zagg Pocket Keyboard

ZIG-ZAGGING TOWARDS A COMPACT SMARTPHONE KEYBOARD.

MEASURING OVER 22CM long, Zagg seems to have been a little optimistic in calling this a pocket keyboard — unless of course you've got pockets deeper than Bill Gates. That said, it is still reasonably small, being comprised of four distinct panels that allow the device to concertina into a single compact slice, and fold-up into the most portable smartphone keyboard we've seen. Two of the four panels are dedicated to the keyboard, while the remaining two make a right-angled A-frame stand which can hold a smartphone or tablet under 8-inches. While this design is certainly interesting, unfortunately there are no braces built into the stand, so it instead relies on tiny plastic hinges that sag under force, and tend to make the keyboard feel flimsy. This problem continues into the keyboard, which can be overextended if it's not used flat on the table further contributing to a somewhat 'economical' overall feel — a little problematic considering it's actually \$25 more expensive than some excellent alternatives.

The Zagg Pocket Keyboard manages to avoid swapping from a traditional key layout and thankfully doesn't remove any integral buttons — unlike some others we've tested — and although the Enter key and some of the punctuation keys have been shrunk to a miniscule proportion, this doesn't impede typing enough to be a real concern. Battery life and connectivity were both solid, though swapping between Android and iOS connections was a little fiddly. All things considered, the Zagg Pocket keyboard is pretty good — the only thing we missed were dedicated play/pause and unlock shortcut buttons — but the flimsy design and premium price tag make it a little hard to recommend over the competition. [JOEL BURGESS]



ZAGG POCKET KEYBOARD

\$99.95
zagg.com

CRITICAL SPECS

85% the size of some laptop keyboards, Li-Po battery with up to 730h of battery life, 22.3cm wide x 17.8cm deep (extended), 194g.





IT'S A SHAME THAT YOU CAN'T USE ALL THAT POWER WITHOUT THIS ONE SOUNDING LIKE A HAIRDRYER, BUT THIS IS PERHAPS THE MOST 'HEALTHY' SLIMLINE GAMING LAPTOP WE'VE YET TESTED



Aorus X5

PUTTING A CAP ON TOO-HOT GAMING LAPTOPS.

GAMING-LAPTOP MAKER AORUS has been building a reputation for its ambitious slimline machine for a few years now and this 15.6-inch model, just 23mm thick, is its latest reworking of that formula. Like its siblings, the X5 comes at a premium price, but does try a bit harder than other gaming laptops by incorporating features that gamers can actually use. Specifically a G-Sync display (making for some buttery-smooth gaming visuals), two GeForce GTX 965M graphics chips in SLI and a row of macro keys on the left side of the keyboard, letting you record and replay a series of keystrokes in game. Plus, there's a copy of X-Split GameCaster included for budding game-streamers.

The other core hardware is pretty good too: a very quick quad-core Core i7-5700HQ processor, 16GB of RAM and storage that's adequately covered by a couple of drives: a 512GB unit for the OS that's actually a RAID 0 setup made of two M.2 SATA 6Gbps SSDs — they're lower-cost Liteon 256GB units, but combined they do manage quite high speeds, nearing 1,000GB/s. (We'd have preferred a single PCIe M.2 drive but that would have pushed the price up.) A second 1TB mechanical drive gives you a good amount of general space.

That 15.6-inch screen has a higher '3K' resolution — meaning 2,880 x 1,620 pixels — and it's an IPS job, with excellent clarity, contrast and colour-reproduction; there's nothing to complain about here. G-Sync works well in eliminating any tearing while gaming and the two GTX 965M's can drive most games at 100fps speeds on medium details. (For high or ultra settings, you'll need to drop the resolution down to 1080p.)

The one main problem with thin gaming laptops is that high-performance CPUs and GPUs generate a lot of heat, and to get that out they employ high-speed, extremely loud fans.

The X5 does at least offer you some options here though, with three manual fan speed modes: Quiet, Normal and Gaming. On Normal and Gaming modes, the fans will spin up quite aggressively — even for non-gaming tasks. In Gaming they're especially hyperactive: we found even just downloading Windows updates was enough to kick the fans into medium gear and be quite audible.

Switching to Quiet mode is perhaps the best option all round. Using it does two things. The first, obviously, is to slow the fans so that they're only spinning at lower, quieter speeds. That doesn't mean it's silent, but it's nearly so.

And second, to make sure those fans don't

ever actually need to run fast, the X5 caps game framerates at 30fps. That has a significant impact on GPU and CPU temps (dropping them from 75/95°C to 65/71°C respectively), but means games are still comfortably playable. Not quite the 'best' of both worlds, but a good compromise — and one that, if used, should increase the lifespan of the device.

Battery life is also a compromise: you'll get around 2 hours at most, something that's typical of machines with this kind of high-end hardware. Physically, the X5 has a footprint that's a bit bigger than other 15-inchers — likely necessary to squeeze all that hardware in — with a wide bezel around the display.

It's a shame that you can't use all that power without this one sounding like a hairdryer, but this is perhaps the most 'healthy' slimline gaming laptop we've yet tested.

[DAN GARDINER]

GENERAL PERFORMANCE			GAMING PERFORMANCE			BATTERY LIFE	
PCMARK8 -HOME (SCORE)	X264 HD BENCHMARK 5.01 (AVG FPS) PASS 1	X264 HD BENCHMARK 5.01 (AVG FPS) PASS 2	3DMARK CLOUD GATE	METRO: LAST LIGHT 1080P, ULTRA (AVG FPS)	BIOSHOCK INFINITE 1080P, ULTRA (AVG FPS)	PCMARK8 HOME (HOURS:MIN)	PEACEKEEPER - WEB SURFING (HOURS:MIN)
4,304	59.75	14.95	23,545	60.67	95	1H 49M	2H 08M



CRITICAL SPECS

Windows 8.1 (64-bit), 15.6-inch IPS LCD G-Sync screen @ 2,880 x 1,620-pixels, Intel Core i7-5700HQ CPU, 16GB RAM, 2 x Nvidia GeForce GTX 965M GPUs, 2 x 256GB SSDs in RAID 0, 1TB hard drive, 2.5kg.



Kogan Agora 3G Lite

SMARTPHONES REALLY DON'T COME ANY CHEAPER THAN THIS.

THE AGORA 3G Lite is similar in many ways to the Sony Xperia E4 we reviewed in our October issue (see page 42). It's also a comfortably-sized handset with a 5-inch screen, quad-core ARM Cortex-A7 CPU at 1.3GHz and a basic Mali-400 MP GPU, 1GB of RAM, 8GB of storage and a 3G cellular radio. The front- and rear-facing cameras are the same (at 2MP and 5MP respectively) and the plastic back comes off to give access to micro-SIM and microSD card slots (the latter supporting cards up to 32GB). Kogan's used a newer version of the Android OS (5.0.2 vs the Xperia's 4.4.4) and also adds in a second SIM slot for a backup 2G-only card. This is, then, a good entry-level phone that easily handles the basics.

While its benchmark results aren't great, for day-to-day tasks you won't really notice — email, web surfing, music- and video-playback, and even a little light 3D gaming are all possible here. The screen is likewise a bit low-res at 480 x 854-pixels, so images on it aren't particularly sharp, but it's certainly functional.

And while its polycarbonate (aka plastic) 155g body doesn't really feel like it could take much punishment (Motorola's budget phones definitely feel tougher, though they're pricier too), it should manage just fine if you're not too rough with it.

Battery life is one aspect that's a bit of a let-down, though. There should be enough juice here to get modest users through a day, but its PCMark 8 result of 5:13hr is a couple of hours behind Sony's E4, which sells for the same price. Kogan's battery is removable though, and extras are just \$19. It's a good option to have... though not as good as having a long-lasting battery in the first place, of course.

[DAN GARDINER]



KOGAN AGORA 3G LITE

\$129
www.kogan.com.au

CRITICAL SPECS

Android 5.0.2, 1.3GHz quad-core ARM Cortex-A7 CPU, Mali-400 MP GPU, 1GB RAM, 8GB storage, dual SIM slots (1 x 2G and 1 x 3G), 5MP/2MP rear/front cameras, microSD card slot (32GB max), 155g.



[WWW.TECHLIFE.NET]



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THIS NEW REPLACEMENT IS A BIT SMALLER AT 14-INCHES, BUT IT BUMPS THE DISPLAY RESOLUTION FROM 1,366 X 768 UP TO 1,920 X 1,080 IN COMPENSATION.



Kogan Atlas X14FHD

CAN THIS BUDGET-LAPTOP SEQUEL MATCH UP TO KOGAN'S ORIGINAL ATLAS?

IT'S FAIR TO say we really liked Kogan's original 15.6-inch Atlas laptop from late last year — a \$329 device that impressed us by covering all the basics a notebook should and even going beyond them in some spots, like its very solid 5-6 hour battery life.

The new Note 5 benefits from all of that, and takes most of its design cues from the well-regarded (and iPhone-esque) Galaxy S6. It largely shares the same speedy Samsung-made hardware under the hood; where it differs is in that bigger screen, an extra gig of RAM and the S Pen stylus. Also like the S6, there are unfortunately some high-profile feature subtractions too: gone are both the removable battery and microSD card slot.

If you're not immediately turned off by the latter downgrades, this is still the best Note ever. Samsung's somehow managed to slim down the physical dimensions even further from the Note 4, with bezels on the left and right of the display that are only a couple of millimetres wide, and the fingerprint sensor is now an optical job — no more swiping — making this much easier to hold and use one-handed.

This new replacement is a bit smaller at 14-inches, but it bumps the display resolution from 1,366 x 768 up to 1,920 x 1,080 in compensation. It's largely the same under the

hood, however, with an identical 2.16GHz Intel Pentium processor (the quad-core N3540), 500GB Toshiba hard drive and Windows 8.1 for the OS. (And as with all Windows 8.1 devices, you can get a free upgrade to Windows 10 until next July.) There are even some surprising elements, like the inclusion of 802.11ac Wi-Fi and physically it doesn't look too shabby either.

The admittedly plain chassis is all plastic (frankly, you're dreamin' if you expect anything better at this price point) and a tap of the palm rest areas will tell you it's a bit hollow inside, but that 14-inch size makes it a little more portable and at 2.1kg with a compact charger it's not too hard to take with you.

That new 1080p screen is pleasing too — it's reasonably neutral in terms of colours, with a tight pixel-pitch meaning images are quite clean — there are no ugly horizontal lines running across the screen, like we've seen on some other budget laptops.

In use, that cheap-and-cheerful demeanour continues; it covers simple computing needs (web, light office tasks, video playback), but has trouble with more demanding tasks like gaming (Angry Birds — yes; Call of Duty — no). The keyboard and trackpad are both serviceable but far from exceptional, and the mechanical hard drive means it's not as

responsive as a system with an SSD — apps can take a little while to first launch, and system searches on the Start screen are on the slow side.

Performance wise, though, there's only one key spot where this 14-inch model isn't as good as its predecessor — battery life. Here, it's about half the older model's 5-6 hours; at most, you'll get about three-and-a-half hours. That higher-res screen is likely the main culprit and while the battery shortfall is a bit disappointing, it's not quite a deal breaker — really, it only seems poor because the older model was comparatively so good.

The other main caveat is that this new Atlas isn't quite as keenly-priced as its \$329 forebear. That's something that the higher-res screen and lower value of the Aussie dollar somewhat help justify. It's worth noting Kogan has two models on offer — opting for the version with 4GB of RAM instead of 2GB will cost you an extra \$10, but is something we'd strongly recommend.

[DAN GARDINER]

GENERAL PERFORMANCE			GAMING PERFORMANCE	BATTERY LIFE	
PCMARK8 - HOME (OVERALL SCORE)	X264 HD BENCHMARK 5.01 (AVG FPS) PASS 1	X264 HD BENCHMARK 5.01 (AVG FPS) PASS 2	3DMARK CLOUD GATE (OVERALL SCORE)	PCMARK8 HOME (HOURS:MIN)	PEACEKEEPER - WEB SURFING (HOURS:MIN)
1331	13.92	3.93	1553	3H 00M	3H 08M

KOGAN ATLAS X14FHD 5

\$359
www.kogan.com.au

CRITICAL SPECS

Windows 8.1 (64-bit), 14-inch LCD screen @ 1,920 x 1,080 pixels, quad-core 2.16Ghz Intel Pentium N3540 CPU, Intel HD Graphics GPU, 2GB RAM, 500GB hard drive, 2.1kg.





Crumpler Dry Red No. 5

A LAPTOP BACKPACK THAT FEELS LIKE IT COULD TAKE ON THE DRY RED PLANET. (WELL, 'MOSTLY' DRY RED PLANET.)

THIS MEDIUM-SIZED BACKPACK from Melbourne-based bag brand Crumpler kind of looks like it belongs on the set of *The Martian* — at least the striking grey-and-red model we tested does — and it's got about as many tricks up its sleeve as Matt Damon's character in the space survival flick. That includes a sneaky zip-shut padded compartment in the back from which you can quickly stash or retrieve a laptop (it'll fit up to a thinnish 15-inch model), a front section that's jam packed with mini pockets for all your smaller gadgets and tools, and a main middle section that can be expanded when needed thanks to a fold of extra fabric. And speaking of the latter, like most Crumples that fabric's very thick and durable, with matching chunky zippers and a lifetime warranty means if any of these bits start fraying or coming apart, Crumpler will repair the damage free of charge. This is a fantastic little pack that can store a surprising amount of gear. Our only real gripe is that, on our wide shoulders, the straps felt a little tight — so if you're broad across the back we'd advise trying this one on in person, or considering the slightly larger Dry Red No. 6 instead. Oh, and if the grey-and-red colour theme isn't your thing, it's available plainer colours like black and dark green.

[DAN GARDINER]



Moshi Urbana Briefcase

FUNCTION MEETS FORM IN THIS IMPRESSIVE LAPTOP CARRY BAG.

WE REALLY HAD no idea how good a briefcase could be until we got our hands on the

Moshi Urbana. This grey bag with brown leather straps has a classy-traditional meets refined-techie look about it -- appealing, but not really distinctive enough to be an exciting feature in-itself. What is exciting is the clever design used throughout. Inside the main compartment is a dedicated laptop sleeve, lined with a thick padding that wraps around the entire PC, striking a good balance between protection and ease-of-use. Cleverly, the wall of the padded sleeve has two more slots for your tablet or e-reader and your phone, saving you from throwing these items in with other less-delicate possessions. A profile view of the bag reveals its clever A-frame structure, which not only creates enough room at the bottom of the main compartment for items as large as a PS4 controller or a set of headphones, but also gives the fully-laden briefcase the stability to stand upright without risk of toppling over. The accompanying shoulder strap has an elastic segment that provides suspension, with a robust-but-elegant shoulder pad and briefcase clasps at alternating front-and-back sides. These all work together to make the briefcase feel surprisingly light and keep it perpendicular to your body while on your shoulder. The bag feels like it's received the attention to detail of a Swiss watch and if you're after a bag that's both stylish and functional we can't recommend it more highly. [JOEL BURGESS]

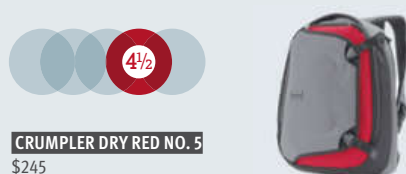


Zagg Speaker Case for iPhone 6

A SMARTPHONE CASE THAT HELPS YOU ANNOY PEOPLE ON THE TRAIN.

EVER BEEN OUT in public and wished you had a compact way of amplifying the music on your phone? Really? You're one of those people? Well, it looks like you're in luck, because Zagg's Speaker Case lets you do just that. The speaker inside connects to your phone via Bluetooth to provide a tinny-sounding volume boost. Conveniently, the case comes in two parts, allowing you to drop its chunky backing and use it as a bumper to protect your iPhone's edges. An interesting design, Zagg's case doesn't actually cover the entire back of your phone, sloping down in the top left corner to leave your camera unobstructed — it's a nice gesture, but it does make your phone look and feel weird. When fully charged, the case provides 8-hours of playback, and buttons on the back let you play, pause and mute the mic at your convenience. If it were much, much cheaper, we could probably recommend the Zagg Speaker Case, but at \$180, we reckon you're better off spending your money on a Bluetooth speaker that delivers more bass.

[STEPHEN LAMBRECHTS]



CRUMPLER DRY RED NO. 5

\$245
www.crumpler.com

CRITICAL SPECS

20 litres volume, expandable main compartment, dedicated laptop compartment (up to 15-inch), front pocket organiser, 1.3kg



MOSHI URBANA BRIEFCASE

\$159.99
moshi.com, beezer.com.au

CRITICAL SPECS

fits 13 to 15-inch notebooks; Mineral Grey, Cerulean Blue and Forest Grey colours available; ViscoStrap shoulder strap suspension (30% less load impact), water resistant.



ZAGG SPEAKER CASE FOR IPHONE 6

\$180
www.zagg.com

CRITICAL SPECS

Rechargeable 1800mAh battery (8-hours play time), micro-USB cable, power sharing via USB



Plantronics BackBeat Sense

THE BEST WIRELESS HEADPHONES FROM A BRAND YOU'VE PROBABLY NEVER HEARD OF.

PLANTRONICS DESERVES MORE attention than it gets, but without a rapper to throw up gang signs or a sports-ball star to wear them around their neck it can tough to boost the cool factor in an oversaturated market. That's a shame, as the Senses really are at the top of their game.

We looked at the amazing BackBeat Pro a little while ago and the Sense are essentially those, but shrinkified into a super lightweight, on-ear version, and at only 140 grams with memory foam cushions and a slung, auto-adjusting headband, comfort is a clear focus.

The left can features the audio play/pause/skip controls, volume adjust and an OpenMic button that lets you hear your surroundings while still wearing the headphones. And on the right side is the power switch, USB charge connection, 3.5mm jack (in the event the battery actually runs dry — probably the apocalypse) plus a big button on the side to answer calls. We found chatting nice and clear indoors, but heading outside traffic ruckus tended to compete with clarity. It helps that there's a mic in both left and right cans, but they're not really recommended for lengthy calls. Music reproduction, on the other hand, is superb, with the little 32mm drivers packing a surprising amount of punch on the lower-end and clarity through the range. Don't get too carried away with the volume though, as they do tend to leak a lot at the upper limits.

Plantronics boasts a battery life of up to 18 hours, and there's a 'deep sleep' mode which senses when the device hasn't been used for a while (like over the weekend when you're not commuting to the office) and hibernates them until they're switched on again. Plus, there's an automatic play and pause function when you take them off, which can further extend battery life. At this pricepoint, there're very few wireless Bluetooth headphones we could recommend above the Sense.

[TROY COLEMAN]



Pendulumic Stance S1

PREMIUM WIRELESS CANS WITHOUT THE PREMIUM PRICE TAG.

A STAGGERING RANGE of Bluetooth headphones exists, with a pair to suit just about every budget. Pendulumic prides itself on 'studio-level' quality, something you wouldn't expect in a wireless set of phones, and a claim like that's usually an indication that the price is sky high. But that's not so here. Instead, you'll find an upbeat but engrossing soundscape -- even without wires -- in a pair of comfortable and stylish headphones.

In wireless mode, the Stance's favour the mids and high end, giving a crispness to everything on our usual playlist, from Arcade Fire, to Daft Punk with Sia and The Prodigy in between. It's a little harsh at first, but dipping into the equaliser to push the bass out proved that they're also very responsive, and able to hold a high volume without distortion. Over Bluetooth, the volume can be adjusted with a knob on the right ear phone, but when used with a cable the volume knob is entirely redundant, and the soundscape actually tilts the opposite way once the wire with its inline remote is plugged in. Here, you'll find warmth with clarity -- a sound you could listen to all day. However, you do need to have them powered up in either mode, using AAA batteries or a rechargeable battery pack.

And you well might want to wear them all day. The adjustable headband is married to a floating cushion (the bit that goes between your scalp and the stiff band) that makes them feel lighter than they are. We're lopping a star off for the plasticky, cheap-feeling switches on the cans that control power and function.

[PAUL TAYLOR]



PLANTRONICS BACKBEAT SENSE

\$249
plantronics.com

CRITICAL SPECS

Bluetooth 4.0, 32mm drivers, 20Hz-20kHz frequency response, Rechargeable battery, up to 18 hours wireless streaming, 21 days standby time, 180 days in DeepSleep mode, MicroUSB connection, 140g.



PENDULUMIC STANCE S1

\$329
busisoft.com.au

CRITICAL SPECS

Bluetooth 4.0, 40mm drivers, 15Hz-22kHz frequency response, 110dB SPL, 32 Ohm impedance, 330g (with AAA batteries).





Astell&Kern AK Jr

A PINT-SIZED HIGH-RES AUDIO PLAYER THAT HAS SOME GROWING-UP TO DO.

THE PREMIER ARM of iRiver has released an entry-level hi-res audio player that supports a staggering amount of audio formats, albeit with a skinny feature set. Jr's bigger brothers are impressive, so there's a lot riding on the smallest A&K.

If we could judge this player by looks alone it'd get five shiny, refined stars. While the case's corners are a little pointy, this slab of aluminium and glass embarrasses other designer-tech thanks to its simplicity and beauty. There's a lot of merit in physical controls, and both the buttons and volume dial are easy to find and use -- clicking and rolling actual buttons after touch screen controls feels remarkably satisfying. The volume dial is lovely, and provides a long, smooth transition from dead silence up to an imposing decibel level.

Sound quality is spectacular, and you can throw a massive variety of audio files at the Jr. If you're going to take advantage of hi-res audio you'll need headphones that are geared up for the task, else the gains from this hardware compared to a major smartphone manufacturer will be minimal. 64GB of storage is built in, with a microSD expansion slot that'll let you add another 64GB -- lots of space for monstrous 40MB-plus lossless files.

Here comes the but. The touchscreen and UI are infuriatingly slow, enough to ruin the experience. 'Functional' would put it kindly, in the same way a shopping trolley is a functional mode of transport. And, there's something funky happening in the firmware, as trying to skip backwards to previous songs is trial and error -- most of the time the song will just restart, over and over. The Jr will suit if you're busting for a portable hi-res player, but it comes with some infuriating compromises.

[PAUL TAYLOR]



BB-8 Droid by Sphero

A NEAT TOY ROBOT WITH REAL BRAINS.

IF YOU'RE ONE of the many Star Wars fans eager to catch the upcoming eighth film outing (The Force Awakens), you've probably crossed paths with the little rolling droid named BB-8 before. But there's something that differentiates this gizmo from the slew of other Star Wars paraphernalia out there: it's been built by the highly successful robotics startup Sphero. This company's speciality is app-controlled robotic balls and BB-8 represents an intriguing culmination of cinematic imagination and real world technology -- some of which rarely comes to fruition this well.

BB-8's top-hat head floats on the droid's spherical body and is attached via magnets, making it completely removable -- as you'll see if you ever drive it off the edge of a step. And though this miniaturized maglev technology is awesome to have in your very own toy, it's just one of the cool tricks BB-8 offers.

Like other Sphero robots, BB-8 is controlled via an iOS or Android app, which lets you manually control it using an easy-to-use virtual joystick. But the Jedi companion also has a mind of its own and can be left on autopilot to patrol the house by bouncing its way around the uncharted terrain. Though Sphero has other products that allow robotics tinkerers to run their own algorithms through the robots, BB-8 has to run on the company's autopilot sequence -- at least initially. Our favourite bit though: BB-8 draws on your smartphone to record and deliver augmented reality 'holographic' video messages using your smartphone's camera and screen.

[JOEL BURGESS]



ASTELL&KERN AK JR
\$699
busisoft.com.au

CRITICAL SPECS

3.1-inch touchscreen LCD @ 240 x 400 pixels, Bluetooth 4.0, Wolfson WM8740 x1 DAC, 24bit/192kHz bit-to-bit decoding, 8kHz-192kHz sample rate support, 1.95Vrms output, supports WAV/FLAC/WMA/MP3/OGG/APE(Normal, High, Fast)/AAC/ALAC/AIFF/DFP/DSF/FLAC/WAV/ALAC/AIFF formats, 93g.



BB-8 DROID BY SPHERO
\$250
sphero.com

CRITICAL SPECS

iOS & Android compatible apps, top speed of 2.1m/s, polycarbonate shell, Bluetooth BLE connection (30m range), inductive charging (over 1 hour of play on a full charge), 200g.



[MILC IT]

Pro shooters for everyone

SMALL SNAPPERS, BIG RESULTS.

[THOMAS DANG]



[BUYER'S GUIDE]

MILC

WHAT YOU NEED TO CONSIDER WHEN PURCHASING A MILC

MIRRORLESS INTERCHANGEABLE LENS cameras (MILCs) — now more commonly known as just ‘mirrorless cameras’ or ‘compact system cameras’ (CSCs) — have come a long way in the last few years. So much so, in fact, that the top end model from Sony, the α7R II is starting to now challenge traditional heavyweight DSLRs from Nikon and Canon as the preferred tools of professional photographers. For enthusiasts like us, this advancement in technology also makes it an exciting time to jump into this powerful category.

The likes of Olympus, FujiFilm and Panasonic have all embraced mirrorless designs and offer a wide range of lenses to suit the many different needs of photography. Once dominated by entry-level DSLRs from the two main players of Nikon and Canon, we now see great offerings from manufacturers that were previously considered bystanders in the enthusiast camera market.

The biggest appeal of MILCs is the smaller body size. Due to the lack of an optical mirror, they can be made much smaller than their DSLR counterparts. Lenses have also been designed specifically for these types of cameras. The lenses for the mirrorless cameras are generally quite small to match the bodies, as opposed to some of the higher-end lenses for DSLRs, which can balloon up to gargantuan sizes. Mirrorless cams are also generally cheaper than their DSLR equivalents — and not just when buying the original body, but for lenses and accessories too.

And despite their small size, mirrorless models are also quite versatile. The fact that there's no physical mirror means that mirrorless cameras can employ sensor-shifting technology to stabilise images, which can be quite effective, especially for video.

One of the biggest drawbacks for this style of camera is that there's no optical viewfinder. This means that, unlike most DSLRs, all the shooting is done through an electronic viewfinder or the LCD, both of which consume some battery life. However, don't let this be a deterrent, as we've found it's still much more convenient to carry around an extra battery than it is to carry around the extra bulk of a DSLR.

LENS RANGE

Some manufacturers have larger lens ranges than others. Unlike the DSLR market, there aren't many third-party lenses available yet, so you'll generally be stuck with manufacturer-made options.

POP-UP FLASH

If you're going to be shooting happy snaps of the family indoors, this feature's quite essential.

ACCESSORIES

Some manufacturers offer more elaborate accessories to expand the use of your camera, such as underwater housing and battery grips.

LCD

Some cameras come with fully articulated LCDs, which can be great for shooting video or just when you want to capture the perfect selfie.

VIDEO

Whilst 4K video isn't the standard yet, it's worth looking for, as it generally means that you'll get better HD videos from it.

IMAGE STABILISATION

Not many mirrorless cameras have this built-in, but it is extremely useful for shooting video to reduce camera shake.

SIZE AND FEEL

For us, the physicality of a camera is one of the most important features. Does the camera feel comfortable in your hands and is its menu system easy to navigate around?

CAMERA WEIGHT

Also often overlooked, you'll need to test this in person. If a camera's too light, it won't sit in your hands very well and if it's too heavy, it won't be fun to carry around.

08

MILCS ON TEST

HOW WE TESTED

To allow for more accurate comparison, we arrange to get hold of all basic kits for all cameras over the course of a specific, week-long period so that we could shoot the same scenes in the same variety of lighting conditions and assess the resulting photos. We also requested similar lenses, where available, to further aid in this.



Olympus OM-D E-M5 Mark II

A GREAT CAMERA WITH INCREDIBLE IMAGE STABILISATION.

THE E-M5 MARK II is an update to Olympus's original (and excellent) E-M5. Boasting a fully articulated 3-inch LCD touch screen, increased focus points, wireless connectivity and improvement to Olympus' five-axis image stabilisation, which compensates for any type of camera shake, you'll forgive its large price tag.

It retains its forebear's dust- and splash-proof magnesium alloy body, but some changes have been made to the controls. The dials and buttons on this camera are all well placed, providing easy access to the main features. The improved fully articulated LCD screen means that you can take photos and videos at almost any angle with ease.

Image quality is superb on the E-M5, performing well in both ideal conditions and in lower-light environments. Our test images were very clean and sharp, whilst colours were quite accurate when in auto mode.

The most exciting upgrade is perhaps the improved image stabilisation, which was already quite impressive in the previous model. Camera shake from wobbly hands is a thing of the past on this new unit. Whilst other MILCs might boast 4K-resolution video, the image stabilisation here makes video shooting easier for everybody. Manual control is also available when recording video, which allows for some quite creative movies.

Olympus has also incorporated wireless control and image transfers, eliminating the need for an Eye-Fi card or cable connection to get your snaps off the device. All up, this is a great camera aimed at those who want the ability to take their photos and videos seriously, but who don't quite want to commit to a high-end DSLR.



OLYMPUS OM-D E-M5 MARK II

\$1,325 (12-50mm weather proof kit)
or \$1,188 (body only)
www.olympus.com.au

CRITICAL SPECS

Image size: 16MP, RAW shooting supported: Yes, Sensor size: 17.3 x 13mm, Screen size: 3-inch tilting touchscreen, Storage: SD Card, Weight ex battery: 417g, ISO Sensitivity: 100-25600, Hot shoe for external flash



TEST BENCH
PRO SHOOTERS FOR EVERYONE



FujiFilm X-T10

RETRO FILM LOVER'S CAMERA.

FUJIFILM'S X-T10 IS another mirrorless camera targeting those that are (or would like to become) a bit more serious with their photography.

With a stylish retro-looking slim body, it features an electronic viewfinder (something that's absent in the entry model X-A2 on page 51), and dials for the shutter speed and aperture. The dials and buttons are designed in a way that encourages users to play with manual settings of the camera, rather than having the settings hidden away in menus.

The X-T10 produces high-quality photos – as you'd kind of expect from a company with FujiFilm's reputation. Just like the company's other shooters, this one also gives you access to film simulators, that mimic the look of well-known films and camera models. The X-T10 comes with a few extra options here compared to the X-A2.

While performance in low light is quite good, with useable images up to about ISO 6400, video isn't one of the X-T10's strengths. Shooting at 60fps is smooth, but has a slightly muted tone to it. The X-T10 is capable at shooting 1080p at 60fps, but without the ability to control the shutter or aperture of the camera.

This one's very well-suited for people that love their photography, but more so those who enjoy the look of the vintage films. If there's one thing that FujiFilm does really well, it's to accurately imitate the colours and tones that you would've achieved during the old film days. The only downside to this wonderful camera is video. It'd be great to see FujiFilm push the video capabilities a lot more on these cameras.



FUJIFILM X-T10

\$1,188 (with 16-50mm lens)
www.fujifilm.com.au

CRITICAL SPECS

Image size: 16.3MP, RAW shooting supported: Yes, Sensor size: 23.6 x 15.6mm, Screen size: 3" tilt LCD, Storage: SD Card, Weight ex battery: 331g, ISO Sensitivity: 100-51200, Pop-up flash





Nikon 1 J5

SMALL AND AFFORDABLE, BUT STILL PACKS A PUNCH.

THE J5 IS Nikon's latest mirrorless camera, packing big capabilities (including a 21MP sensor, 3-inch tilting touchscreen, pop-up flash and wireless capabilities) into a rather small body.

The two main features that excited us the most about the J5 were the capability to shoot 4K video and the flipping touchscreen for selfies. The selfie feature is designed to give you the most flattering scene by automatically adjusting camera settings, whether that's with flash or without. Of course, you can also shoot without flipping the screen, which will give you more control over the settings you choose. 4K video is a little more of a mix. The J5 can only capture 4K at a maximum of 15fps — well below the 'film' standard of 24fps. However, this is still quite handy when shooting scenes where the camera is mounted, such as landscape video. HD video can be recorded at up to 60fps and there's a good amount of control offered in the Advanced Movie mode.

The image quality of the J5 was quite good in our tests, and it performed well in most scenarios, including low light. In fact, it's surprisingly good considering the sensor size is the smallest of those we've reviewed here. The videos are quite high in contrast, which can be good if you don't plan to edit, as the colours do have a bit more pop.

Despite the compact camera look and feel, the J5 packs a punch with its combination of great features and reasonable price. A good option for those looking to get a low-priced enthusiast camera that they can have some fun with.



Panasonic Lumix DMC-G7

A SOLID ALL-ROUNDER WITH GREAT FEATURES.

AIMED AT THE enthusiast, the Lumix DMC-G7 features a 16MP sensor, 4K video shooting and a very intuitive app that works hand-in-hand with the built-in wireless capabilities.

The lightweight DSLR-type body includes dials and buttons for easy access to the most important features of the camera, such as the aperture, shutter speed, ISO and manual and auto focus. It also features a fully-articulated touchscreen LCD and large electronic viewfinder.

4K Photo mode, which was featured on earlier Panasonic cameras, is a feature that allows you to take a series of photos at 4K resolution (8MP) at 30 fps, much like a video. The camera then allows you to go back to select the image that best captures the moment.

The photo quality straight out of the G7 is quite good, with very usable images right up to ISO 12800. The JPEGs straight out of the camera are sharp. The live photo preview allows you to see what the image will look like before taking it.

4K video is recorded at 25fps, whilst HD video can shoot as fast as 50fps if you want something that little bit smoother. The video quality is very sharp. Whilst you're unable to set the aperture for video, you're able to have some degree of control with the ISO and exposure compensation.

With its wide range of features, the G7 is perfect for anyone looking to capture the moment, and have an easy time learning to do so.



NIKON 1 J5

\$615 (with 10-30mm lens)
www.nikon.com.au



CRITICAL SPECS

Image size: 21MP, RAW shooting supported: Yes, Sensor size: 22.3 x 14.9mm, Screen size: 3-inch touchscreen, Storage: microSD Card, Weight ex battery: 231g, ISO Sensitivity: 100-12800, Pop-up flash



PANASONIC LUMIX DMC-G7

\$770 (body only), \$877 (14-42mm lens)
www.panasonic.com/au



CRITICAL SPECS

Image size: 16MP, RAW shooting supported: Yes, Sensor size: 17.3 x 13.0mm, Screen size: 3-inch fully articulated touchscreen, Storage: SD Card, Weight ex battery: 360g, ISO Sensitivity: 160-25600, Pop-up flash



FujiFilm X-A2

A REASONABLY-PRICED FILM LOVERS DIGITAL CAMERA.

THE X-A2 IS the successor to FujiFilm's 2013 X-A1; both are entry-level mirrorless cameras. This new unit boasts an upward-tilting LCD for better selfies, plus Wi-Fi, a pop-up flash and a hot-shoe for external flash. Image quality on the whole is pretty high-quality too.

Sporting a very cool retro-looking body, it's slightly larger than a typical MILC and has enough buttons and dials for easy access to the main features of the camera.

The X-A2 continues to deliver on FujiFilm's strengths of high quality and stylised photos, from the wide range of film simulators. The X-A2 sees the introduction of the Classic Chrome into the X-A series, which is nice homage to some of the older chrome films. Of course, the colour is also quite accurate if shooting with the standard colour simulator, but that'd almost defeat the purpose of buying a FujiFilm camera.

Video isn't a strong point when it comes to the X-A2. The maximum framerate is 30fps when recording at 1080p and 720p. Control is limited to adjusting the exposure compensation. However, what it does lack in control, it kind of makes up for in film simulators, which let you shoot cool retro-looking videos.

With FujiFilm, it's a case that you always know what you're going to get; this is a camera that delivers superbly on easy-on-the-eye colour simulations. However, that admittedly may not be to everyone's liking. The weakness of video is probably an acceptable trade-off on those that want the company's film simulators for their photos, and it's certainly reasonably priced.



FUJIFILM X-A2

\$668 (16-50mm lens)
www.fujifilm.com.au



CRITICAL SPECS

Image size: 16MP, RAW shooting supported: Yes, Sensor size: 23.6 x 15.6mm, Screen size: 3-inch touchscreen, Storage: SD Card, Weight ex battery: 300g, ISO Sensitivity: 100-25600, Pop-up flash



Panasonic Lumix DMC-GX8

A DECENT BUT NOT QUITE OUTSTANDING ALL-ROUNDER.

PANASONIC'S GX8 IS its higher-end mirrorless option, costing a bit more than the G7 on the opposite page but sports a 20.3MP sensor and uses the Four-Thirds system for lenses. It has 4K video capability as well as 4K photo burst, which is now a feature in the latest Panasonic mirrorless cameras. Wireless camera control and photo transfers is also made possible via the easy-to-use app.

The rangefinder style body is made of magnesium alloy and is weather proof. It features an adjustable EVF, which will save your neck when taking shots down low. There's a dedicated dial for exposure compensation along with plenty of dials and buttons for easy access to the key features.

Like the G7, the 4K Photo mode allows you to take a series of photos at 4K resolution (8MP) at 30fps, as if it were a video. Again, you'll see a sequence of shots, and from there you can select the image you want. Stock standard settings produce good quality photos, with useable images up to ISO 12800.

Much like its sibling, the G7, 4K video is shot at 25fps and HD is recorded at 50fps. Video quality is sharp, as you would expect from 4K video. It comes with the same restrictions whereby the only control you get for video recording is from the ISO and exposure compensation.

Compared to its lower end sibling the G7, the GX8 produces very similar imaging quality in both photo and video. The biggest difference is in the weather proof body and adjustable viewfinder. As a higher end model, there probably should be more features opened up on this camera.



PANASONIC LUMIX DMC-GX8

\$1,162 (body only), \$1,270 (14-42mm kit lens)
www.panasonic.com/au



CRITICAL SPECS

Image size: 20.3MP, RAW shooting supported: Yes, Sensor size: 17.3 x 13.0mm, Screen size: 3-inch full articulated touchscreen, Storage: SD Card, Weight ex battery: 435g, ISO Sensitivity: 100-25,600



Sony Alpha A5100

COMPACT SIZED CAMERA DELIVERS MIRRORLESS FEATURES.

SONY OFFERS QUITE a huge selection of mirrorless cams and the A5100 sits around the middle of its range. And despite being in the mirrorless category, it actually feels a lot more like a compact fixed-lens camera, especially with the way that Sony have the zoom lever, more commonly found on compact cameras. The lack of dials for exposure, aperture and shooting modes also adds to the compact cam feel.

Inside, it still packs an APS-C sized sensor, which is able to produce decent quality images. In ideal shooting conditions, the A5100 does perform very well. However, when it comes to shooting in low light, bumping the ISO up to anything above 3200 and the quality unfortunately starts to suffer.

Video can be recorded at 1080p at 60fps. Surprisingly, when shooting video, the A5100 can still give you a large amount of control, provided you first select the Manual Exposure mode. This is by far the camera's best feature, as most others in this price range seem to have video exposure limited to the exposure compensation and sometimes the ISO. With these features, it makes it easier to get the right exposure on the video, rather than letting the camera's light sensors do the guesswork.

While the A5100's compact camera appearance may be a turn off to some people, don't let looks fool you: this is a camera that can still get the job done, albeit in a somewhat different way to some of the other more traditional mirrorless options. Its wide variety of compatible lenses doesn't hurt, either.



Canon EOS M3

THE ENTRY-LEVEL DSLR GOT SHRUNK.

THE EOS M3 is third iteration of the EOS M, though the M2 was never officially available in Australia and other major markets. This upgraded model gets a bigger 24MP sensor, new processor, tilting LCD touchscreen, wireless and a pop-up flash.

Canon's also made some changes to the layout and operation of buttons and dials to make key features a little more accessible. The body shape remains largely the same, with the two biggest improvements being that pop-up flexible flash and the tilting LCD.

Photo quality is great, with excellent sharpness and colour processing and the M3 performs quite well in low light, with still very useable photos from ISO 12,800. It's rather disappointing that the video resolution or framerate hasn't been improved, however, considering a lot of cameras are now able to shoot 4K video. This shoots 1080p video at 30fps, which is disappointing given that the camera already lacks in other departments. For example, Canon's lens range is very limited, with only four dedicated lenses for the entire EOS M series. An EF lens adaptor is available to use with the wide range of lenses that Canon has for their DSLRs, but the latter are often bigger and heavier than lenses designed for mirrorless use. This probably says a lot about the direction of the Canon as a whole; it's clearly choosing to focus its efforts for their DSLR range. However, using a large EF lens on a small EOS M body really defeats the purpose of a mirrorless camera.

All up, the M3 is targeted at current Canon DSLR users who want to have a camera that's slightly smaller, but is compatible with their current collection of lenses.



SONY ALPHA A5100

\$788 (with 16-50mm lens)
www.sony.com.au

CRITICAL SPECS

Image size: 24.3MP, RAW shooting supported: Yes, Sensor size: 22.3 x 15.6mm, Screen size: 3" touchscreen, Storage: SD Card, Weight ex battery: 224g, ISO Sensitivity: 100-25600, Pop-up flash



CANON EOS M3

\$846 (18-55mm kit lens) or \$733 (body only)
www.canon.com.au

CRITICAL SPECS

Image size: 24MP, RAW shooting supported: Yes, Sensor size: 22.3 x 14.9mm, Screen size: 3-inch tilting touchscreen, Storage: SD Card, Weight ex battery: 366g, ISO Sensitivity: 100-25,600, pop-up flash and hot shoe for external flash





SAMPLE PHOTOS – MILCS COMPARED

Each of the images below were deliberately shot with near identical camera settings in order to produce JPGs for judging image quality and lense framing.



MANUFACTURER MODEL	CANON EOS M3	FUJIFILM X-A2	FUJIFILM X-T10	NIKON 1 J5	OLYMPUS OM-D EM-5	PANASONIC LUMIX G7	PANASONIC LUMIX GX8	SONY ALPHA A5100
COST	\$846 (18-55mm kit lens)	\$668 (16-50mm kit lens)	\$1188 (16-50mm kit lens)	\$615 (10-30mm kit lens)	\$1325 (12-50mm weather proof kit lens)	\$877 (14-42mm kit lens)	\$1270 (14-42mm kit lens)	\$788 (16-50mm kit lens)
MAX RESOLUTION	6000 x 4000	4896 x 3264	4896 x 3264	5568 x 3712	4608 x 3456	4592 x 3448	5184 x 3888	6000 x 4000
EFFECTIVE PIXELS	24MP	16MP	16MP	21MP	16MP	16MP	20MP	24MP
SENSOR SIZE	APS-C (22.3 x 14.9mm)	APS-C (23.6 x 15.6mm)	APS-C (23.6 x 15.6mm)	1" (13.2 x 8.8mm)	Four Thirds (17.3 x 13mm)	Four Thirds (17.3 x 13mm)	Four Thirds (17.3 x 13mm)	APS-C (23.6 x 15.6mm)
ISO	100-12800 (expandable to 25600)	200-6400 (expandable to 100-25600)	100-51000 (JPG), 200-6400 (RAW)	160-12800	200-25600 (expandable to 100-25600)	100-25600	200-25600 (expandable to 100-25600)	100-25600
IMAGE STABILISATION	No	No	No	No	Sensor-shift	?????	Sensor-shift	No
SHOOTS RAW?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LCD	Tilting 3"	Tilting 3"	Tilting 3"	Tilting 3"	Fully articulated 3"	Fully articulated 3"	Fully articulated 3"	Tilting 3"
VIEWFINDER	Electronic (optional)	None	Electronic	None	Electronic	Electronic	Electronic (tilting)	None
BUILT-IN FLASH	Yes (flexible)	Yes (flexible)	No	Yes (flexible)	No (external flash included)	Yes (flexible)	Yes (flexible)	Yes (flexible)
EXTERNAL FLASH	Yes (via hot shoe)	Yes (via hot shoe)	Yes (via hot shoe)	No	Yes (via hot shoe)	Yes (via hot shoe)	Yes (via hot shoe)	No
FLASH SYNC SPEED	1/200 sec	1/180 sec	1/180 sec	1/60 sec	1/250 sec	1/160 sec	1/250 sec	N/A
VIDEO RESOLUTION	1920 x 1080 (30p), 1280 x 720 (60p)	1920 x 1080 (30p), 1280 x 720 (30p)	1920 x 1080 (60p), 1280 x 720 (60p)	4K (15p), 1920 x 1080 (60p), 1280 x 720 (120p)	1920 x 1080 (60p), 1280 x 720 (60p)	3840 x 2160 (30p), 1920 x 1080 (60p), 1280 x 720 (60p)	3840 x 2160 (30p), 1920 x 1080 (60p), 1280 x 720 (60p)	1920 x 1080 (60p), 1440 x 1080 (30p), 1280 x 720 (120p)
WIRELESS	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
WEATHER SEALED	No	No	No	No	Yes (water and dust resistant)	No	Yes (water and dust resistant)	No
WEIGHT (BODY W/ BATTERY)	366g	350g	381g	231g	469g	410g	487g	283g
NUMBER OF LENSES AVAILABLE	Four native to EF-M mount, optional EF adaptor	17	17	12	38	25	25	TBC

[HOW TO]

Mirrorless cameras: the quickstart guide

IF YOU'RE NEW TO MIRRORLESS SHOOTING OR JUST NEED A REFRESHER, THIS QUICK GUIDE WILL GET YOU SNAPPING LIKE A PRO IN NEXT TO NO TIME.

[THOMAS DANG]

TO GET THE most out of your new mirrorless camera, there are a few key things you should do once you've recharged the battery.

READ YOUR MANUAL

This may sound silly, but it's probably the most important and underrated thing to do after you've just purchased a new camera and isn't just for those that are new to photography. Unless you already own the exact same camera, chances are there are things about the camera that you won't already know. There's nothing worse than when you're using your camera and you're trying to do a certain thing, but don't know how to get to that function and end up losing the shot as a result. It happens to a lot of people. The camera is a tool for you to express your creativity. If you don't know how to use it, then you won't be able to get the most out of it.

So spend the time going through the manual with your camera by your side and learn what all the different features of the camera do. You're unlikely to use them all, but at least you'll know how to use those less popular ones when the moment presents itself.

The key shooting modes on all mirrorless cameras are: P (Program mode), S (Shutter priority), A (Aperture priority), and M (Manual mode).

- * Program mode is almost automatic. It allows you to toggle with the ISO, whilst the aperture and shutter speeds are dictated by the camera's light sensor.
- * Shutter priority is semi-automatic. It allows you to set the camera's shutter speed and ISO, whilst the camera's light sensor will determine the aperture required for a well-lit frame.
- * Aperture priority is also semi-automatic. It allows you to set the camera's aperture (how much light is let into the camera) as well as ISO, whilst the camera's light sensor determines the shutter speed.
- * Manual mode gives you complete control over all the settings. This is usually the steepest part of the learning curve, once you understand how Shutter Priority and Aperture Priority work.

BUYING ADDITIONAL LENSES

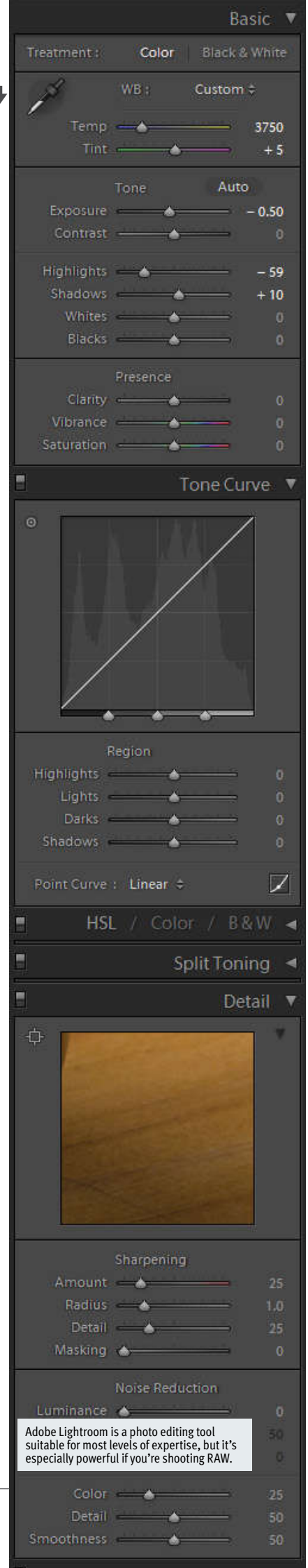
If you're relatively new to photography, then buying additional lenses shouldn't be the first thing that you jump into. You'll want to familiarise yourself with the camera and the type of scenery, subjects and situations you like to shoot. Once you're familiar with the camera, you'll start to see where the limitations of the kit lens lies for the type of photography that you're interested in.



Specialised lenses are typically really good at one thing.



If you're going to shoot video and RAW, you'll want a class 10 memory card.





When cleaning lenses, ensure you blow away any dust before wiping with a microfiber cloth.



Carrying spare batteries mean that you'll never have your camera die midway through the day.

As an example, if you find yourself shooting a lot of landscapes, you'll want to get yourself a wide angle lens. The speed of the lens isn't as important for landscapes, as generally you'll be shooting at a tighter aperture (higher f-stop number) so that you have a greater depth of field. However, if photographing people is your thing, then you'll want to consider a faster lens (lower f-stop) so that you can create a shallow depth of field, otherwise known as bokeh, which allows you to separate your subject from the background.

SHOOTING RAW

Most cameras will allow you to shoot both RAW and JPG at the same time. As long as you have a big enough memory card, then it's recommended that you shoot in both RAW and JPG. As you might know, JPGs are compressed, whilst RAW files are uncompressed data. RAW allows you to tweak your photos afterwards in a program like Adobe Lightroom (see '5 things to know').

Lightroom will allow you to tweak your photos. Whilst you can still tweak JPGs, you won't get the same results as adjusting the RAW files. If you want to give your photos a warmer feel than what was actually captured, you're able to adjust the colour temperature

without losing any details. RAW files also allow you to fix up certain things about a photo, such as under/over exposure. A lot of people use RAW files only as a method of fixing up bad photos, which it can do, but it shouldn't be the only reason you make adjustments to RAW files.

SHOOTING VIDEO

Video capabilities of still cameras have come a long way. Most mirrorless cameras will be able to shoot at a minimum of 1080p these days, with some able to shoot at 4K resolution. The key things to remember when shooting video are motion and sound. Your video should either be still or have very smooth movements flowing throughout. Some cameras come with excellent image stabilisation that minimises camera shake. However, you can still achieve relatively good steady movement by holding the camera with two hands and moving with your feet slowly.

Simple editing can be done in Microsoft's Movie Maker for Windows users or iMovie for Mac users. The most difficult thing for first time movie creators will be editing the video after you've recorded at that footage. ■

5 things to know

THE KEY THINGS TO KEEP IN MIND WHEN USING A MIRRORLESS CAMERA.

LENSES

The standard kit lens is a good starting point. You'll want to buy into a system with a variety of lenses on offer to suit your evolving shooting preferences and styles. If you already own lenses from a certain manufacturer and want to use those lenses on a different manufacturer's mirrorless camera, check to see if the manufacturer makes an adaptor, as some do for different lenses.

BATTERIES

A spare battery is almost a must if you even intend on travelling with the camera. There's nothing worse than having to conserve your camera's energy after shooting some video.

ADOBE LIGHTROOM

Mirrorless cameras have the capability to shoot in uncompressed formats. To process these images, Lightroom 6 can be purchased for \$186. It's a fairly easy to use program that allows you to make batch adjustments to your images and export them as JPGs.



LENS CARE

Get a rocket blower to blow away any dust off the front of the lens. You'll want to do this before wiping the front of the lens, so as to avoid scratching the glass. For any smudges, you can use a microfiber cloth, which you can find at any camera store.

MEMORY CARDS

If you're going to be shooting RAW and/or video, you'll want a fast memory card that will record the files quickly. This is especially true for video, which will continuously be recording data onto the memory card.

[EXPENSES WERE SPARED]

Thrifty tablets on test

WE COMPARE SIX ANDROID, IOS AND WINDOWS TABLETS STARTING FROM JUST \$220.

[BENNETT RING]

DESPITE INCREDIBLE GROWTH in recent years, it seems that the Tablet market is finally slowing down. According to IDC's Worldwide Tablet Tracker, as of July this year sales had dropped 7% compared to the previous year. This is big news for a product category that once experienced 30% annual growth. Whatever the reasons are for this slump, one thing is for sure – consumers have many more options to choose from when buying a tablet than just a few short years ago. Budget tablets now make up almost half of all tablet sales, up from a quarter a year ago, which is great news for your wallet. However, figuring out which tablet to buy gets exponentially more difficult as the number of viable options appear on shelves. We've taken a look at six of the most affordable tablets on the market to see which one is deserving of your attention.

THE APPLE FELL

While many associate Apple's iPad as being the first tablet on the market, it was actually a Microsoft product that took the honour a full decade earlier. Microsoft pushed four versions of the tablet computer in the early 2000s, but the one that looked most like today's models was known as the Slate. Ditching the keyboard in favour of a touch-screen, it relied heavily upon a stylus. Rather than make these machines itself, Microsoft came up with the basic Tablet PC specification, which were then made by the usual hardware vendors. However, a combination of issues meant the tablet standard failed. One of the biggest issues was the size and weight of the early tablets, each weighing several kilograms. Microsoft also positioned them as PC replacements, and they had the price tags to match, costing upwards of several thousand dollars. Finally, battery life wasn't ready for all-day performance; even today some tablets struggle to last a full day.

A decade later Apple's iPad solved all of these issues, and the company has held the top spot ever since. However, its dominance is under serious threat thanks to the huge range of competitors now flooding the marketplace with affordable models. According to IDC, Apple sold 10.9 million iPads in the second quarter of this year and 24.5% of the market. However, Samsung is nipping its heels, with 7.6 million sales in the same quarter and a total market share of 17%. It'll be interesting to see how this race plays out over the coming year, but the days of Apple's dominance are surely endangered.



Apple iPad Mini 4 (16GB)

PRESTIGIOUS AND PRICEY.

IF YOU'RE LOOKING to buy a tablet that offers outstanding value for money, this iPad is not for you. Ditto if you're after a tablet that can serve double duty as a part-time laptop, as the small size of the Mini makes it unsuitable for sustained use as a productivity application. However, if you want a tablet that excels at the usual tablet duties – web browsing, casual gaming, occasional emailing, Skype and more – and don't mind paying a premium for its stunning screen, then the Mini could be just what you're after.

Compared to other iPads, the Mini's strength is its tiny size, packing a 7.9 inch screen. It weighs just 299g, yet still includes a relatively powerful A8 processor. We say relatively, as the new iPad Pro will come with the A9X, which appears to be a massive leap forwards. In action the iPad Mini 4 feels nice and smooth, and our 3DMark result shows that it's still got the guts to take on much larger devices when it comes to 3D performance.

The most important part of a tablet is the screen, and very few tablets come close to Apple's. The 2,048 x 1,536-pixel display used on the Mini 4 shows why. Some would argue that such a small screen doesn't need that resolution, but when viewed in the real world, the difference is obvious, though the auto-brightness is a little low for our liking.

While the competition are racing to catch up to the likes of the Mini 4, at the end of the day it's still got the performance and screen quality to keep it ahead of the pack. Throw in arguably the sexiest aesthetics, and the high price tag doesn't seem so unreasonable after all.

06

BUDGET TABLETS TESTED

HOW WE TESTED

Given the wide variety of operating systems, sizes, prices and physical configurations of these tablets, we tested each one in scenarios that reflected its overall design, and also ran a cross-platform gaming benchmark (3DMark's Ice Storm Unlimited) to assess their general graphics rendering capabilities.



APPLE IPAD MINI 4 (16GB)

\$569

www.apple.com/au

CRITICAL SPECS

A8 64-bit processor; 16GB onboard storage; 7.9-inch LCD @ 2,048 x 1,536 pixels, 299g.





HP Pavilion X2

A GREAT CONVERTIBLE, YET AVERAGE TABLET.

THE HP PAVILION X2 is arguably the tablet most like a laptop in our roundup. It uses a convertible design, and the keyboard/base is included in the stock price. However, it's not just a keyboard that makes this feel like a fully-fledged laptop – there's also the Windows 8.1 operating system, which can run all of your favourite software.

Despite the small dimensions of the base, the keyboard is a breeze to type on thanks to the elevated island key design. The touchpad is relatively responsive, but it's easier to simply touch the screen instead. Speaking of which, we love the 10.1-inch on this tablet when it's in laptop mode; it's crisp and easy to read, with vivid colours and accurate touch-tracking. However, when in tablet mode, the native resolution of 1,280 x 800 just doesn't compare with the incredibly high-res screens found on other tablets. A speaker adorns each side of the screen, pumping out surprisingly generous sound for such a small device. The entire unit is built from plastic, and tips the scales at 1.18kg with base, 580 grams without. One minor omission is high-speed 802.11ac Wi-Fi, which is standard on most of the competition.

Tucked away in the tablet is Intel's Atom Z3736F processor, and its quad cores deliver excellent performance in Windows. We were very surprised at how snappy this machine is given the small amount of onboard memory, though the 64GB SSD no doubt helps.

As a dedicated tablet, there are better options available. However, the inclusion of a serious keyboard makes this a much more versatile device than pure tablets, and as a laptop the Pavilion X2 isn't half bad at all.



HP PAVILION X2

\$549
www.hp.com

CRITICAL SPECS

Intel® Atom™ Z3736F Processor; 2GB system memory; 64GB onboard storage; 10.1" 1280 x 800 display, 1.18kg.



Sony Xperia Z3 Tablet Compact

A CLOSE CONTENDER TO THE IPAD MINI.

THE IPAD MINI 4 has some serious competition on its hands in the form of this ultra-light tablet from Sony. Weighing a mere 270g and just 6.4mm thick, it's so slight that you'll easily forget you've got one stashed away in your handbag or backpack. Even better, it's waterproof up to a depth of 1.5 metres for 30 minutes, making it the ideal reading companion while having a bath or swim.

The screen isn't quite as sharp as the Mini 4, with a resolution of 1920 x 1200, but it's still a stunner. Sony displays have a reputation for excelling at colour reproduction, and the Z3 is no exception. It's also razor-sharp when it comes to accuracy, unlike some of the more affordable tablets on offer, precisely detecting exactly where we'd touched it. One unique feature of the Z3 is the ability to stream PS4 games to the tablet, which will be then playable via a PS4 controller. However, the flipside is a heavy abundance of bloatware loaded onto the Z3, with Sony heavily promoting its own services and software.

An added bonus to this device is the included LTE 4G connectivity, which costs extra on competing tablets. The 8.1 megapixel camera didn't perform too well though, surprising given Sony's experience with these products. The final negative is that the entire unit is made of plastic, so doesn't quite have the premium feel of an aluminium iPad.



SONY XPERIA Z3 TABLET COMPACT

\$499
www.sony.com.au

CRITICAL SPECS

Qualcomm Snapdragon 2.5GHz quad-core CPU; 3GB of RAM; 16GB onboard storage; 8-inch LCD @ 1,920 x 1,200 pixels, 270g.





Toshiba WT10-A Encore 2

ENTRY-LEVEL WINDOWS.

SITTING SMACK BANG in the middle territory between premium and budget tablets is Toshiba's WT10-A Encore 2. It offers a unique value proposition, being one of the cheapest ways to experience Windows.

Possibly the biggest thing going against this tablet is, ironically enough, its size. The 10.1 inch screen isn't abnormal for a convertible, but this is being sold as a dedicated tablet without a detachable base. Compared to other dedicated tablets, which tend to be both thinner and lighter than the 550 grams and 9mm on offer here, and this tablet soon feels a little ungainly. If you don't mind the extra weight, the next thing to get your head around is the Operating System, which is Windows 8.1. Considering there's no keyboard included in the box, the stylus will become mandatory. An optional Bluetooth keyboard is available, but it'll set you back around \$100 or so.

Performance of the Intel chip isn't exactly record-breaking, but it's enough to deliver a responsive system, especially for this price. When combined with the extremely accurate screen, it makes for a very pleasant desktop experience, whereas certain other tablets became frustrating as pages took longer to load, and touch inputs were mis-read. The 32GB of onboard storage sits in the middle of the pack.

Overall this is a rather unique tablet, in that it delivers the most affordable way to enter the Windows 8.1, and now 10, ecosystem we've ever seen. It's also a rather good tablet in the process.



Lenovo Yoga Tablet 2

INEXPENSIVE, BUT CAN YOU STAND THE WEIGHT?

WHETHER OR NOT this is the tablet for you will probably come down to this device's most unique feature, the rotating stand on the bottom edge of the screen. When extended, it allows this tablet to be easily propped up on a desk, kitchen or seat-back table, but that same stand adds a lot of weight to the overall unit. If you want a super-light, small tablet that you're happy to operate from the palms of your hand, the bulky stand will likely be a turn off, as the entire unit weighs 619 grams.

Part of this weight is likely due to the large 10.1 inch IPS display, which packs a very crisp 1,920 x 1,200 pixels into its smallish frame. It's not in the same league as the Mini 4, but is still exceedingly readable, if a tad lacklustre in its colour reproduction. Touch-accuracy is also a little wonky, which we noticed several times when trying to close tabs in Google Chrome; it instead opened up a new one, which became quite frustrating. The hardware within isn't quite up there with more expensive tablets, but it's not far behind. In day to day use we found the overall responsiveness to be ok, if not lightning-fast.

If you're looking for a good value tablet that you can stand on its own two feet, the Yoga Tablet 2 has plenty to offer. However, if you want the absolute best in hardware at an incredibly light weight, it probably doesn't tick the right boxes for you.



TOSHIBA WT10-A ENCORE 2

\$399
www.toshiba.com.au

CRITICAL SPECS

Intel Atom Z3735F Processor; 2GB system memory; 32GB onboard storage; 10.1" 1280 x 800 display



LENOVO YOGA TABLET 2

\$349
www.lenovo.com

CRITICAL SPECS

Intel Atom Z3745 Processor; 2GB system memory; 16GB onboard storage; 10.1-inch LCD @ 1,920 x 1,200 pixels, 619g





Kogan Agora HD Mini

AN EXAMPLE OF AGING UNGRACEFULLY.

CONSIDERING KOGAN FIRST released this tablet a year and half ago for just \$199, we're slightly dismayed to see that the price has actually increased since then. We understand that the crashing Aussie dollar hasn't helped, but it still leaves a rather bitter taste in the mouth to see that it's now \$20 more expensive than at launch, yet technology has moved on by 18 months since then.

For the price you get a plain-Jane Android tablet that weighs a lot more than it should, at 398 grams. It feels chunky in the hand, despite only weighing 100 grams more than the Mini 4. The 7.85 inch screen is truly average, its problems starting with rather obvious pixel structure. Colours are washed out and lifeless, despite it using an IPS panel.

For the price we can forgive the lack of 802.11ac Wi-Fi, as well as the tiny onboard storage amount of 16GB. We're not so sure about the processor though. After using the other tablets, and being accustomed to apps opening as soon as we touched them, having to wait several seconds for each action was a real pain in the posterior. Our 3D benchmark backs up just how outdated the processor within really is.

The one advantage this tablet has over the rest is a ridiculously low price tag. Yet there are other generic tablets now flooding store shelves that weren't designed back in 2013, making the Agora HD hard to recommend.



KOGAN AGORA HD MINI

\$220
www.kogan.com.au

CRITICAL SPECS

MT8389 CPU; PowerVR GPU; 1GB of RAM; 16GB onboard storage; 7.85-inch LCD @ 1,024 x 768 pixels, 398g.



[BUYER'S GUIDE]

BUDGET TABLETS

WHAT YOU NEED TO CONSIDER WHEN PURCHASING A LOW-PRICED TABLET.



IOS, ANDROID OR WINDOWS?

You've got three choices of operating system when buying a tablet. Choose that one that fits with your other devices, and you know how to operate.

CONVERTIBLE

Some tablets can transform into a miniature laptop with the addition of a keyboard base. They tend to be bigger and more expensive, but also more versatile.

SCREEN SIZE

One of the biggest differentiators of tablets is their size. The bigger it is, the more capable the hardware within, but the higher the price tag.

METAL VS PLASTIC

Metal tablets tend to last longer than plastic versions, but this weakness can easily be solved with an affordable protective case.

BUDGET

Entry-level tablets can be bought for less than \$100, while convertible PC tablets running Windows, such as Microsoft's Surface Pro 3, can easily cost a couple of grand.

BATTERY LIFE

if you're going to be using your tablet all-day, every day, try to get something that has a solid 10 hour or better battery life

CAMERA AND MIC

one of the most popular uses for a tablet is as a cheap VOIP platform. If you want to Skype your family, make sure the tablet has a built-in camera and mic.

KEYBOARDS

if your tablet is going to be doing a lot of word processing or other data-entry intensive duties, we highly recommend buying an optional Bluetooth keyboard. The onscreen keyboards are good for short emails, but nothing more.

[HANDS ON]

Windows 10: The gear is here!

WINDOWS 10 DEVICES ARE FINALLY ARRIVING, SO WE'VE ROUNDED UP THE FIRST LAPTOPS, TABLETS, CONVERTIBLES AND ALL-IN-ONE PCs TO SEE HOW THEY STACK UP.

[BENNETT RING]

SOME MIGHT CLAIM it's simply an excuse for Microsoft to mine marketing data from its users, while others suggest that it's merely putting lipstick on a pig, but there's no denying that Windows 10 has been extremely popular since launching a few months ago. Depending on who you believe, somewhere between 15 and 60 million customers have now hit the upgrade button on the bottom right of their Windows 8.1 screen. The fact that Windows 10 is free for Windows 8.1 users makes it a bit of a no-brainer; the reintroduction of a Start button that is actually useful doesn't hurt either. At the same time as Windows 10's release, came Intel's new Broadwell and Skylake processors, giving hardware vendors two very good reasons to launch new products. We've rounded up ten of the latest Windows 10 devices, covering the entire gamut from convertible tablets to all-in-one PCs, to see which devices benefit most from Redmond's new operating system.

As far as hardware requirements go, Windows 10 is extremely lean and efficient, making it perfect for portable devices that lack reams of RAM and oodles of processing power. Microsoft claims that just one Gigabyte of RAM is required for the 32-bit mode, doubling to 2GB when switching to 64-bits. A mere 1GHz CPU is the bare minimum, while a wafer-thin 16GB of drive space is required for the 32-bit version of the OS, increasing to 20GB for 64-bits. Finally, a DirectX9 graphics adaptor paired to a 800 x 600 display is the last requirement. Given these light-weight system specifications, it's no wonder that the range of hardware running Windows 10 is incredibly wide. Let's see how it runs across various devices.



WINDOWS 10 LAPTOPS



Acer Aspire R11

A CHEAP AND CHEERFUL CONVERTIBLE.

IT'S AMAZING THE difference an SSD can make. Nearly every device in our roundup came equipped with one, but Acer instead chose to use a much larger, yet slower, 500GB mechanical hard drive in the Aspire R11. The difference was obvious as soon as we started using the machine, with a slight pause between when we asked the machine to do something, and when it actually responded. This delay was usually just a split-second, but enough to notice, and loading our benchmarks took substantially longer than on an SSD.

Thankfully the rest of the system is well specced for this price point. The 11.6 inch screen mightn't have the widest viewing angles, but the clever hinges allow it to be used in tent or presentation mode. It's also touch enabled, a nice inclusion at this price point, which is offset by the lower resolution of 1,366 x 768 pixels.

Tucked away under the hood is Intel's Pentium N3700 Processor, a quad-cored critter with a top speed of 2.4GHz. Paired with 4GB of DDR3 memory, this hardware combo should be enough to deliver respectable performance, yet the R11 occupied the bottom rungs of our performance ladders. The blame lays squarely at the feet of the mechanical hard drive, which simply can't keep up with flash-based drives. On the plus side, battery life was simply incredible, hitting almost four hours of heavy use, the second best in our roundup.

The lack of an SSD doesn't help this affordable laptop win any favours, but thankfully there's the option to buy the R11 with an SSD installed. It's only 32GB in size, but it'll make a world of difference.



ACER ASPIRE R11
\$699
www.acer.com.au

CRITICAL SPECS
Intel® Pentium® Processor N3700; 4GB DDR3; 500GB HDD;
11.6" 1366 x 768 display





Gigabyte Q2550M

IT DOESN'T GET ANY CHEAPER.

GOING HEAD TO head against the likes of Acer's Aspire E15, the Q2550M is Gigabyte's attempt to capture the price-conscious market. In many ways it shares the same strengths as the Acer... not to mention the same flaws.

It begins with the display. 1,366 x 768-pixel simply doesn't cut it for a 15.6 inch screen, as individual pixels are far too easy to spot. At least Gigabyte went with a matte display, making it much easier to read in bright lighting conditions. Once again we see a nice full-sized keyboard, married to a relatively average touchpad. As with the Acer touchpad, movement feels a little laggy and inaccurate, but not bad enough to bother plugging in a mouse.

Unlike Acer, Gigabyte has stuck with Intel for the Q2550M's processor. The Core i5-4210U only has twin cores, but they're HyperThreaded, with a top frequency of 2.7GHz. A mere 4GB of memory is just enough to keep Windows 10 running responsively, but Gigabyte has followed in Acer's mechanical footsteps when it comes to the hard drive, with a 500GB HDD. There's no option to swap this at purchase either, though users are free to do so after they've bought it. On the flipside, Gigabyte has included a DVD burner in this laptop, something missing from Acer's unit.

Considering how similar both machines are, the \$200 price saving on the Gigabyte laptop makes it hard to recommend the Acer. For that price you'd be able to install a sizeable SSD into the Gigabyte, making it the superior machine in every way.



Acer Aspire E15

A WINDOWS 10 LAPTOP WITH AMD INSIDE.

DO YOU FONDLY remember good old-fashioned laptops that weren't small enough to fit inside a purse, couldn't convert into 27 different shapes and weren't powered by a fusion engine? So do we, and the Aspire E15 is one such classic laptop. It's big enough to make it a pleasure to use all day, which gives it room to squeeze in hardware that rivals desktop PCs, all at a price that won't break the bank.

It seems strange to say that the 15.6" screen feels large, yet it does thanks to the glut of 10-inch and 11-inch laptops around these days. Sadly the resolution of 1,366 x 768-pixels means pixel structure is very obvious, and we're not big fans of the glossy finish. The large screen dictates the overall size of the unit, giving Acer enough room to squeeze a full-sized keyboard onto the base. The entire unit is made from plastic, yet feels nice and sturdy. The weight of 1.58kg isn't a backbreaker if you need to haul it around all day.

Acer has gone for a rather unique mix of hardware inside the E15. Firstly there's the AMD CPU. The A4-7210 CPU packs four cores running at 2.2GHz under load, and also features AMD's Radeon R3 integrated GPU. This graphics architecture ran rings around most of the competition, making the E15 one of the few machines suitable for casual gaming. However, the E15 didn't hold up too well in our other tests, likely as a result of the use of a mechanical drive instead of an SSD.

While we love having a terabyte of storage, the loss of performance is a bit of a deal breaker. When compared to Gigabyte's affordable laptop, the E15 simply doesn't have the extras to justify the \$200 price hike.



GIGABYTE Q2550M

\$599
www.gigabyte.com.au

CRITICAL SPECS

Intel Core i5-4210U CPU; 4GB DDR3 memory; 500GB HDD; 15.6" 1366 x 768 Display



ACER ASPIRE E15

\$799
www.acer.com.au

CRITICAL SPECS

AMD A4-7210 CPU; 8GB DDR3 memory; 1TB HDD; 15.6" 1920 x 1080 Display





Microsoft Surface Pro 3

ALMOST AS GOOD AS A MACBOOK.

AT THE TIME of writing, Microsoft had slashed \$210 off the price of the variant of the Surface Pro 3 we reviewed, making it exceptional value. However, it's likely that the price will jump back up to \$1399 by the time you read this, but even then it's a killer machine for the price.

So just what is it about the Surface range that has seen it become a billion dollar business for Microsoft? For starters there's the build quality and stunning good looks. The aluminium rear includes a very slick yet useful stand that can prop the screen up at a range of angles, while the polished glass front simply exudes class. It's a tad larger than the Surface 3, with a 12-inch screen, and the resolution has been given a shot in the arm, leaping to a crisp 2,160 x 1,440. No wonder that the pixel structure is invisible. It's a fully touch enabled screen, and is arguably the most accurate we've ever fondled, making it easy to select even the smallest fields on websites. The new Surface Pen is an absolute stunner, with its ability to detect various pressures leading to the most natural hand-writing we've felt on a tablet, and it's included in the box.

Intel's Core i5-4300U might only have twin cores, but the inclusion of HyperThreading and a top speed of 2.9GHz ensures super-fast responsiveness. 4GB of DDR3 is a little low for a machine of this price, but only becomes noticeable if you're unwise enough to open several taxing applications at once. With swift performance, a killer design and respectable price tag (for this variant at least) the Pro 3 is our favourite convertible Windows 10 PC.



Microsoft Surface 3

FORGO THE PRO FOR DECENT SAVINGS.

AT LESS THAN half the price of the most expensive Surface 3 Pro, we expected the vanilla variant known as the Surface 3 to offer a fraction of the performance and features of its bigger brother. To our delight we were proven wrong; while plenty of corners have been trimmed, this is an exceptionally priced tablet, though you'll need to shell out extra to make the most of it.

The Surface 3 comes in two flavours, and the version reviewed here is the more expensive variant; the entry level goes for \$699 but only has half the SSD and system space. Unfortunately there's no keyboard included with any of the Surface models, and the new Surface 3 Type cover goes for a rather expensive \$180. It's a must-have if you're going to be entering lots of data into your tablet, as there's simply no faster way to input text than via a dedicated keyboard, but it does bump the total cost of ownership up to over a grand.

Considering that price, the hardware within this tablet looks a little tame, especially the Intel Atom x7-Z8700 CPU, which tops out at 2.4GHz, though it does pack four cores. 4GB of onboard memory is also on the low end, yet when combined with the system's SSD, performance is surprisingly responsive. Unlike certain other devices in the roundup, which ran superior hardware, the Surface 3 was quick to open applications and swap between open windows. Add one of the nicest displays in this price range and the incredibly portable weight of just 620 grams, and this is a potent tablet for the upwardly mobile.



MICROSOFT SURFACE PRO 3

\$1,189

www.microsoftstore.com

CRITICAL SPECS

Intel Core i5-4300U CPU; 4GB DDR3; 128GB SSD;



MICROSOFT SURFACE 3

\$839

www.microsoftstore.com

CRITICAL SPECS

128GB SSD; 4GB DDR3 memory; Intel Atom x7-Z8700 Processor; 10.8" 1920 x 1080 display





Toshiba Portege Z20t-B

A CONVERTIBLE THAT'S BUILT TO LAST.

THIS PREMIUM CONVERTIBLE from Toshiba has an extremely sturdy screen locking mechanism. The screen/tablet is held in place via two large metal plugs, along with a couple of locking hooks, and it looks like it'll last a lifetime. This is incredibly important in a convertible, as the hinge is often the first point of failure.

With the base detached, the sleek 12.5-inch screen weighs just 730 grams. Windows 10 automatically switches to tablet mode when it's detached, and the touch-screen is wonderfully accurate. It might only be a 1080p display, yet it looks much crisper than expected, while the matte finish means it's usable in harsh sunlight.

Even with the base attached, the entire unit still weighs just 1.51kg, and we love the response of both the mouse and keyboard. The speedy CPU within ramps up to almost 3GHz under load, and when combined with the SSD and 8GB of memory delivers razor sharp performance. Even its 3D performance isn't too shabby, thanks to the Intel HD Graphics 5300 integrated into the CPU. But where this device really excelled was battery life, clocking an amazing 616 minutes in our demanding battery test. That's a solid 50% longer than the next closest competitor.

It might cost a little more, but the snappy performance, sturdy build quality and extreme portability of this convertible make it exceptionally desirable. It might not be quite as sexy as Microsoft's Surface range, but in many ways it's the superior device.



Lenovo ThinkPad 10

A DIRECT RIVAL TO THE SURFACE 3.

GOING HEAD TO head against the likes of Microsoft's Surface 3, Lenovo's ThinkPad 10 is another ultra-light weight tablet that packs a decent enough punch to operate as a laptop... provided you don't mind shelling out for the optional keyboard. It's got an identically sized screen to the Surface 3, but ups the resolution to an even better 1,900 x 1,200 pixels, and the extra pixels are easy to notice. Thankfully Windows 10's excellent new scaling features makes it easy to adjust font and icon size to fit this resolution, and we think the Lenovo has a slight edge when it comes to portraying deep, dark blacks.

Following the Surface 3's feature-list once more, the ThinkPad uses an identical Intel Atom x7-Z8700 Processor, a quad-cored jobbie that peaks at 2.4GHz. The memory configuration is also identical, at 4GB, but the SSD is smaller, measuring half the size at just 64GB. This will fill up in no time in today's era of 4K movies and lossless audio files.

One of the flagship features of this new tablet is its new digitiser pen; sadly it wasn't included in our review sample, so we'll have to take the word of friends who are familiar with it. Apparently it does a fine job, albeit not quite as impressively as the Surface Pen. And that's the issue with this tablet in a nutshell – overall it's a very solid, dependable machine, yet comes off second best when compared to the similarly priced, but sexier, Surface 3.



TOSHIBA PORTEGE Z20T-B

\$2099
www.toshiba.com.au

CRITICAL SPECS

Intel Core M-5Y71 CPU; 8GB DDR3 memory; 256GB Toshiba SSD; 12.5" 1920 x 1080 display



LENOVO THINKPAD 10

\$999
www.lenovo.com.au

CRITICAL SPECS

Intel Atom x7-Z8700 Processor; 4GB DDR3 memory; 64GB SSD; 10.1" 1900 x 1200 display



ACER ASPIRE R11



GIGABYTE Q2550M



ACER ASPIRE E15



MICROSOFT SURFACE PRO 3



MICROSOFT SURFACE 3



TOSHIBA PORTEGE Z20T-B



LENOVO THINKPAD 10



ACER AZ3-710



VENOM BLACKONE



GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
1715	128	1739	5.1 / 128	7H 06M

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
2554	241	3239	10.2 / 258	TBC

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
1787	382	2799	28.8 / 726	3H 41M

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
2789	248	3619	11.3 / 285	3H 20M

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
2170	104	2043	6.9 / 17.4	DNF

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
2618	106	3458	9.8 / 247	10H 16M

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)	PCMARK 8 - HOME BATTERY LIFE (ACCELERATED)
1601	104	2074	6.4 / 162	5H 18M

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)
2831	396	6811	29 / 731

GENERAL PERFORMANCE	GENERAL PERFORMANCE	GAMING PERFORMANCE	GAMING PERFORMANCE
PCMARK 8 - HOME (ACCELERATED)	CINEBENCH R15 (CPU TEST)	3DMARK CLOUD GATE	UNIGENE HEAVEN (BASIC MODE) (FPS/SCORE)
3216	590	7437	21.8 / 549



Acer AZ3-710

A SOLID MID-RANGER

ACER HAS CRAFTED a very clever all-in-one in the Z3 series. They've borrowed the iconic stand and chassis design of another famous, rather more expensive AIO, but replaced the original's aluminium construction with similar-looking plastic. The result is an all-in-one that looks rather pricey, but comes with an exceptionally low price tag.

The large 23.8-inch display shares the same HD resolution of the Venom BlackOne – and by HD we mean the real standard of 1,920 x 1,080 pixels, not the 1,366 x 768 rubbish that several of the machines in this roundup claim is HD. Despite this, pixel structure is far less noticeable on the Acer machine, and the image quality overall is superior, with better contrast and richer colours. If only it was a touchscreen, we'd be even more impressed.

As our benchmarks attest, despite the reasonable price tag, this AIO has relatively speedy performance, with one major exception. The quad-core Intel Core i5-4460T ramps up to 2.7GHz when the going gets touch, and is paired with 8GB of DDR3 memory. There's even a discrete GPU in the form of Nvidia's GT 840M, explaining its excellent 3D graphics performance. Sadly the long-term storage isn't so fast, with Acer choosing a large 1TB mechanical hard drive in place of a speedier, more expensive SSD. As such, it's not as responsive as SSD-equipped machines, which is a real shame, as otherwise we'd recommend this without hesitation.



Venom BlackOne

THIS SNAKE DOESN'T BITE.

VENOM IS A boutique Australian PC maker that creates machines with a focus on performance rather than rock-bottom prices. The BlackOne is a great example of this approach; when compared to Acer's all-in-one, the Venom's specs show why it costs almost a thousand dollars more. But is it a good PC, considering all-in-ones still struggle to gain acceptance in the Australian market place?

All-in-ones have traditionally been plagued with heat issues, resulting in their reliance upon power-sipping processors. Thankfully, in this system Intel's Core i7-4702MQ processor has no such problems, even when all four of its HyperThreaded cores Turbo boost up to 3.2GHz. When combined with the 16GB of DDR3 memory, it's no surprise to see the BlackOne top our performance metrics. This is aided by the inclusion of a 240GB SSD, alongside a vast 2TB mechanical drive for less speed-intensive tasks. Best of all, the BlackOne delivers this performance without sounding like Bronwyn Bishop heading down to the shops, remaining it was whisper quiet during our lengthy benchmarking sessions. If only it looked as sexy as it performed, as its chunky black lines look rather affordable to say the least.

If there's one flaw with this unit, it's sadly one of the most important factors of an all-in-one – the display. Measuring 21.5-inches across the diagonal, it packs a resolution of 1,920 x 1,080, giving it a grainy, pixelated look up close. It's a real shame, as the multi-touch capability of the display makes it fantastic to use without a mouse. In fact, the relatively low resolution is our only major gripe with this machine.



ACER AZ3-710

\$1,499
www.acer.com.au

CRITICAL SPECS

Intel Core i5-4460T CPU; 8GB DDR3 memory; 1TB HDD; 23.8" 1920 x 1080 display



VENOM BLACKONE

\$2,479
www.venomcomputers.com.au

CRITICAL SPECS

Intel Core i7-4702MQ CPU; 16GB DDR3 memory; 240GB SSD + 2TB HDD; 21.5inch 1920 x 1080 Multi-touch display





Fix any Windows 10 annoyance

THERE'S LOTS TO LIKE ABOUT WINDOWS 10, BUT YOU CAN MAKE IT EVEN BETTER BY ELIMINATING SOME COMMON ANNOYANCES.

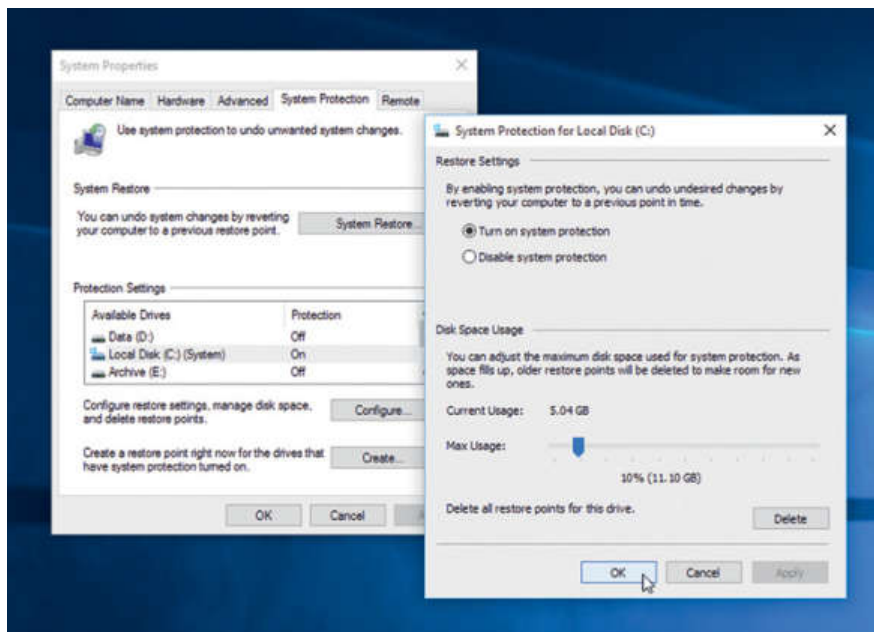
WINDOWS 10 BLENDS the best features of Windows 7 and 8.1 together, but there are still potential hurdles to overcome if you truly want to enjoy it. In this feature we've rounded up 32 annoyances you're likely to come across with your new operating system, which you might want to change. You'll discover how to restore features taken out of Windows 10, such

as the DVD Player or Windows Media Center, make sure settings are correctly applied to protect your privacy and security, plus resolve issues with the minimum of fuss.

Once you've worked your way through our list, you'll have a PC that's working for you, not the other way round. Without further ado, it's time to get Windows 10 firmly in line.

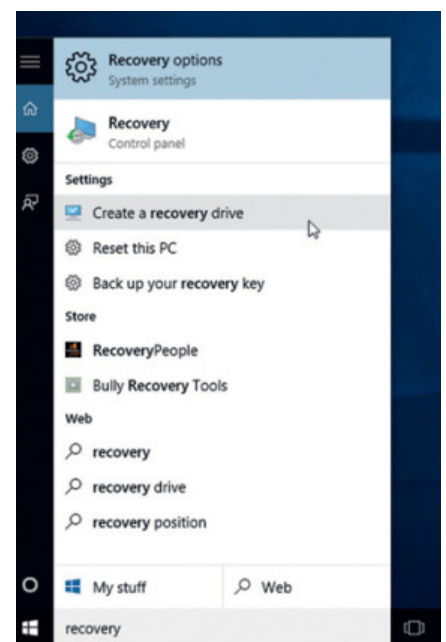
RECOVER HARD DRIVE SPACE

Once you're up and running with Windows 10, and convinced you won't need to go back to your previous version of Windows, it's time to free up drive space. Open File Explorer, go to This PC, right-click your C drive and choose Properties, then click the Disk Clean-up button. As soon as the dialog opens, click 'Clean up system files' and wait for it to scan again. Go through the list ticking those items you don't need — the biggest item by far will be 'Previous Windows installation(s)'. Tick this to free up space, but remember there's no going back once the files are gone.



SWITCH SYSTEM RESTORE BACK ON

Don't ask us why, but Windows 10 disables System Restore by default. The first thing to do, then, is switch it back on. Press the Windows+Pause/Break keys together to open System Properties and click 'System Protection' in the left-hand column. You should see Protection Settings have been switched off for all your drives. Locate your Windows drive (it should be marked 'System') and click the 'Configure...' button. Select 'Turn on system protection' and allocate up to 10% of your available space using the slider. Click 'OK' twice to finish the job.

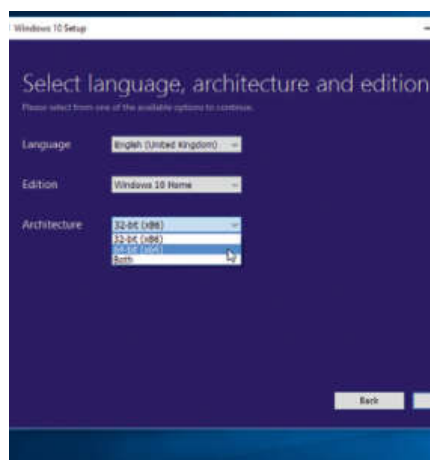
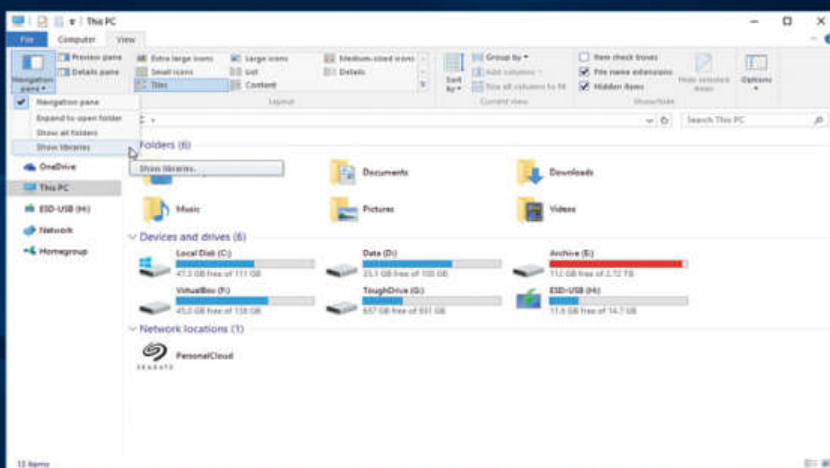


MAKE RECOVERY DISC

What happens if Windows 10 fails to boot? You need a system recovery drive that gives you access to Windows 10's repair options. You can create a full-blown reinstall disc with these tools (see the next tip) or you can press a spare 1GB USB flash drive into service instead with just the repair utilities in place. To do the latter, plug the drive into your PC, then type 'recovery' into the Search box and click 'Create a recovery drive' under Settings. Untick 'Back up system files to the recovery drive' ticked and follow the prompts to create your drive. Should you need to use it, restart your PC with the drive plugged in to access the tools.

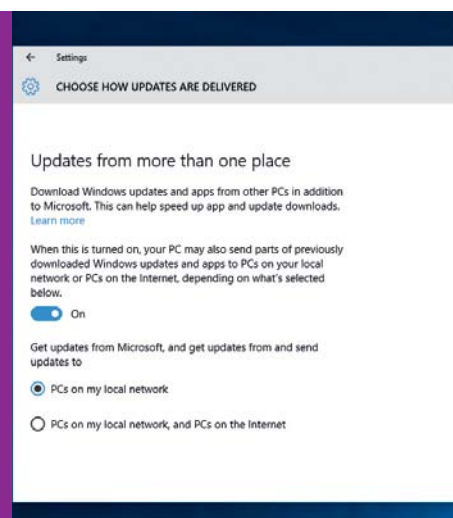
BRING BACK LIBRARIES

The Libraries feature may be niche, but it can also be incredibly useful. If you've upgraded from Windows 7 you may be wondering where they've gone — thankfully they're still present, but hidden by default. To bring Libraries back, open a File Explorer window and switch to the View tab on the ribbon. Click the 'Navigation pane' button on the left and choose 'Show Libraries'. Note, Libraries can also be seen if you have 'Show all folders' ticked — they'll appear under the 'This PC' section in the Navigation pane.



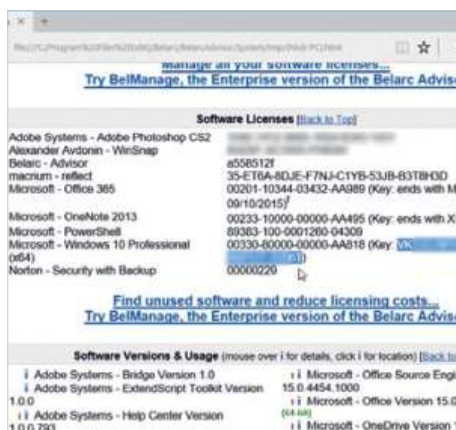
SAVE BANDWIDTH

Did you know that Windows 10 uses peer-to-peer technology to deliver Windows updates? What this means is your internet connection is used to share updates you've downloaded with other users. If you're on a slow broadband connection, or you'd rather not let Microsoft do this you can change it. Click 'Start' and choose 'Settings'. Select 'Update & Security' and click 'Advanced options' under Windows Update. Next, click 'Choose how updates are delivered' and either switch the feature off or select 'PCs on my local network' to further cut bandwidth usage by only sharing the updates between PCs in your home.



CREATE A REINSTALL DISC

It also pays to be able to reinstall Windows from scratch should you need to. You'll need a blank DVD or spare 8GB USB flash drive. First, download the Windows 10 Media Creation Tool from www.microsoft.com/en-gb/software-download/windows10 — choose the 32-bit or 64-bit depending on your system type (press Windows+Pause/Break and look under System if you don't know this). Now launch the tool. Select 'Create installation media for another PC', click 'Next' and follow the prompts to select your language, edition and architecture (32-bit or 64-bit). Insert your USB flash drive, or create an ISO file you can then burn to a single DVD.

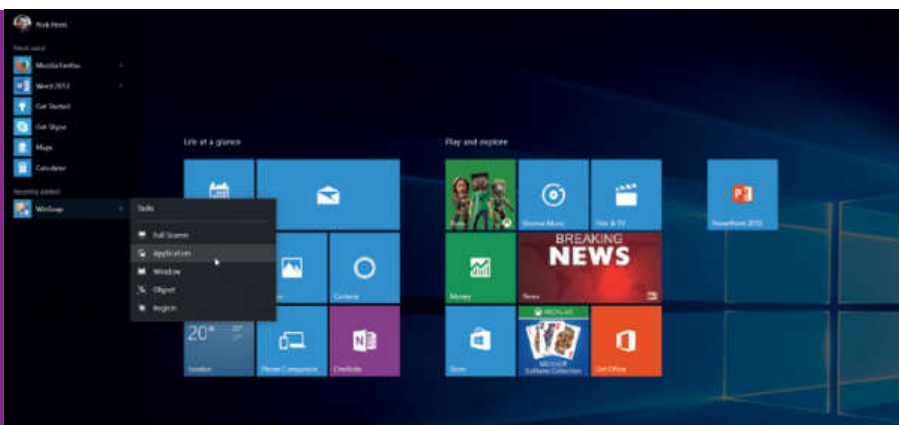


WHERE'S YOUR PRODUCT KEY

If you've taken advantage of the free Windows 10 upgrade offer, then you won't have been given a product key. You won't need it going forward — you can note it down using Belarc Advisor (www.belarc.com), but what you'll discover is it's identical to everyone else who has upgraded to the same version of Windows (whether it's Home or Pro) as you. Should you need to reinstall Windows, skip the bit where you're asked for a product key and Microsoft will recognise your PC as legitimate and activate it with no problem.

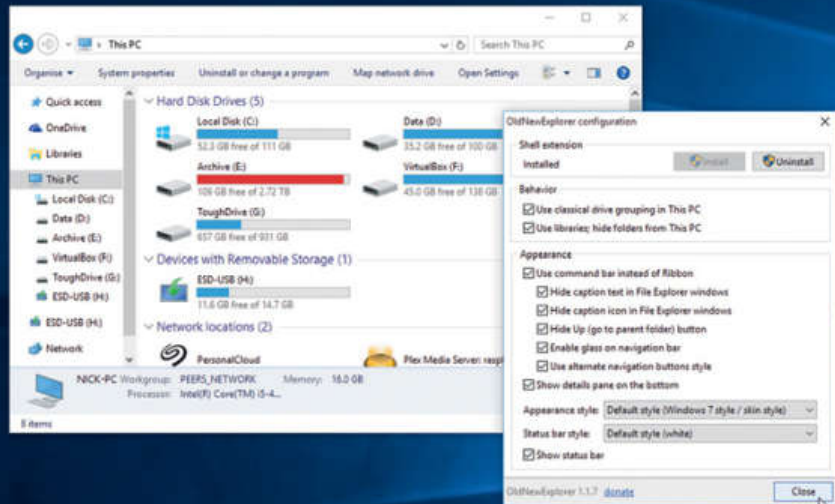
RESTORE THE START SCREEN

If you prefer the full-screen Start screen experience from Windows 8 and 8.1, click 'Start > Settings' and go to 'Personalisation > Start'. Click the 'Use Start full screen' to 'On' and when you next click the Start button the menu will appear full-screen, with the tiles given all the space they need. Click the menu button in the top left-hand corner to reveal the new Start menu's left-hand pane with the shortcuts to 'Most used' and 'Recently added' apps, plus File Explorer, Settings and power buttons as well as the 'All apps' menu.



LOSE THE FILE EXPLORER RIBBON

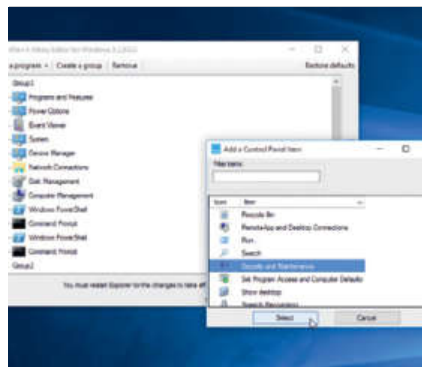
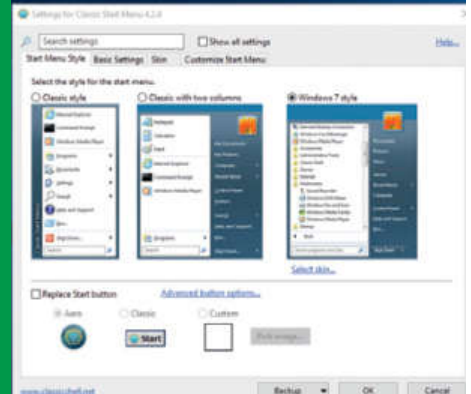
We've loved the File Explorer since its introduction in Windows 8, but if you're not a fan of its ribbon interface, then you can disable it and restore the Windows 7 look using a program called OldNewExplorer – download it from <http://tihy.net/files/OldNewExplorer.rar>. You'll need a program capable of extracting RAR files to use it – try 7-Zip (www.7-zip.org). Once extracted, launch the program and click 'Install', then tick the various boxes to change how File Explorer looks — close and reopen any File Explorer windows to see the effects.



Programs and Features
Power Options
Event Viewer
System
Device Manager
Network Connections
Disk Management
Computer Management
Command Prompt
Command Prompt (Admin)
Task Manager
Control Panel
File Explorer
Search
Run
Shut down or sign out
Desktop

RESTORE CLASSIC START MENU

If you've upgraded from Windows 7, you might not like the new Start menu at all. If you're hankering for the 'classic' style, then download and install Classic Shell from www.classicshell.net. During installation, untick all entries except 'Classic Start Menu' and 'Classic Shell Update'. Once it's installed, click the Start button to configure it – the default settings should be fine, so click 'OK'. The classic Start menu blends in with the Windows 10 look, but provides settings and shortcuts you'll be more familiar with – there's even a shortcut to the Windows 10 Start menu too.

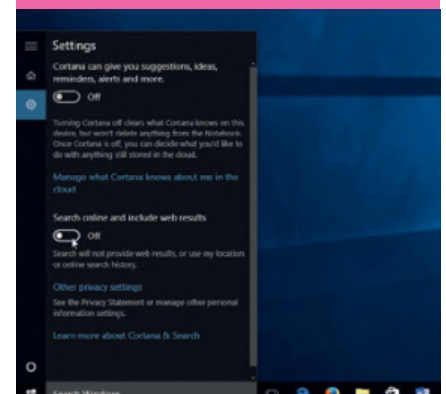


ADD SHORTCUTS

Once extracted, browse to the x64 (64-bit) or x86 (32-bit) folder, then double-click WinXEditor.exe to start tweaking. Click the 'Add a program' button and choose 'Add a program' to manually browse for a program, or 'Add preset' for options such as shutdown and restart entries. You can also easily add individual Control Panel applets and administrative tools, including Disk Cleanup, Task Scheduler and more. Organise applications into groups, and remove any you don't need. Click 'Restart Explorer' to update the menu, or 'Restore defaults' to undo all your changes if you make a mistake.

DISABLE CORTANA

There's little doubt the Windows 10 search bar is useful, but it links into Microsoft Cortana by default. If you decide you don't like Cortana's additional tools, reduce its functionality to that of previous versions of Windows: click the search bar to open Cortana. If you're using it for the first time, click 'Not interested' to disable it; otherwise, click the Settings button and flick the 'Use Cortana' switch to 'Off'. You can also disable the web portion of Windows 10's search capabilities from here too, restricting searches to files, programs and settings on your PC.

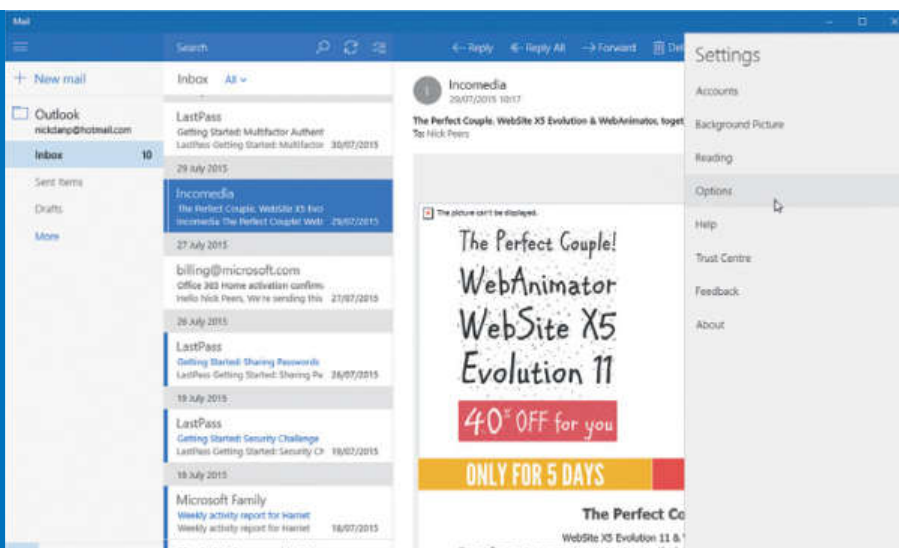


CUSTOMISE THE HIDDEN START MENU

Like Windows 8 before it, Windows 10 has a hidden Start menu – press the Windows+X keys or instead right-click the Start button to access it. The menu includes handy shortcuts to hidden parts of your system such as the old Control Panel, Run dialogue box and Event Viewer. But why stop there? Add your own, or rearrange and delete existing shortcuts courtesy of the Win+X Menu Editor. Download the zip file from <http://winaero.com/download.php?view.21>, right-click it and choose 'Extract All' to save it to a suitable folder.

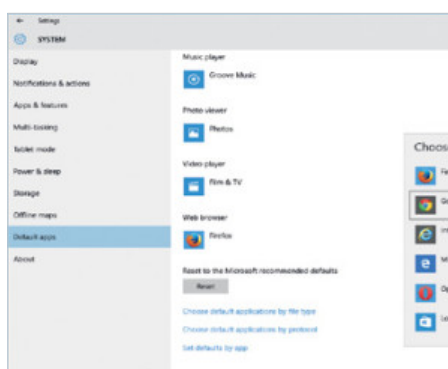
WHERE HAS THE CHARMS BAR GONE?

Windows 8's Charms bar – accessible from the right-hand edge of the desktop – has disappeared in Windows 10. For those who miss it, here's where you find its tools now: first, the Power and Settings buttons are accessible directly from the Start menu itself, while the Search box on the Taskbar replaces the Search charm. Other Charms, including Settings, Share and Print are now incorporated into Microsoft Store apps – some apps make them available via the hamburger-like menu on the app's title bar; otherwise they're hidden inside the app itself.



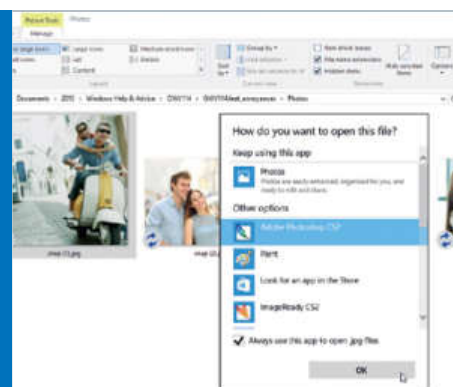
CHANGE DEFAULT APPS IN SETTINGS

After upgrading to Windows 10, Microsoft changes your default browser to Edge. To fix this manually, click 'Start > Settings > System > Default apps'. Click the Edge entry and then pick your browser from the list that pops up. You can change other key app defaults here: video, photo, mail and so on. For a wider range of app choices, click 'Set defaults by app'. Advanced users can also set defaults by file type or protocol using the appropriate links.



CHANGE DEFAULT APP BY FILE TYPE

If your app isn't listed when trying to set it as the default via Settings, try this instead: browse to a file you want to open, then right-click it and choose 'Open with > Choose another app'. Then tick the 'Always open this app...' box before selecting your chosen default. If it's not in the list, click 'More apps' to reveal more choices, and if your chosen program still isn't there, click 'Look for another app on this PC' to manually select it. Start your search under Program Files or Program Files (x86).

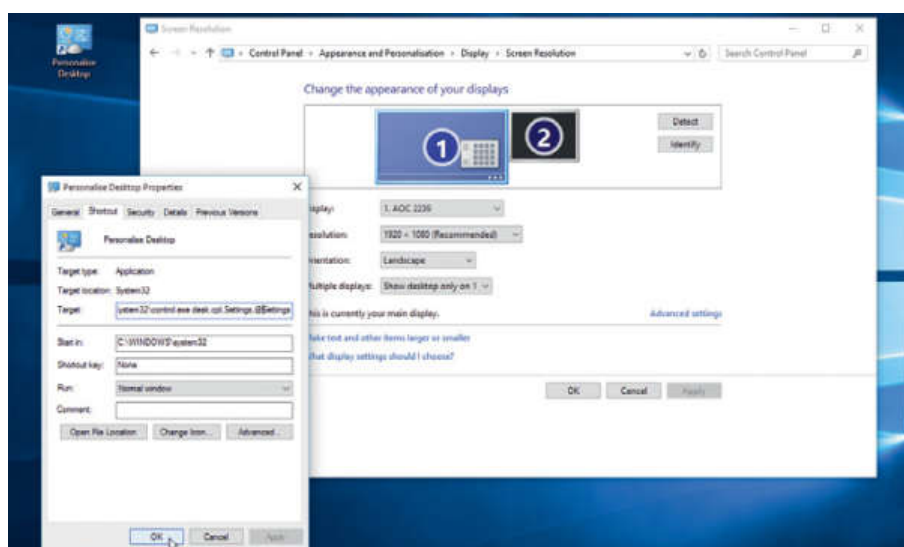


TIGHTEN PRIVACY IN EDGE

If you stick with Edge, there are some important privacy settings you need to switch on before relying on it. Launch the browser, then click the '...' button in the top right-hand corner and choose 'Settings'. Scroll down and click 'Advanced settings' and make sure the 'Block pop-ups' slider is set to 'On'. While you're here, flick 'Send Do Not Track requests' to 'On', then set Cookies to 'Block only third-party cookies' for greater privacy.

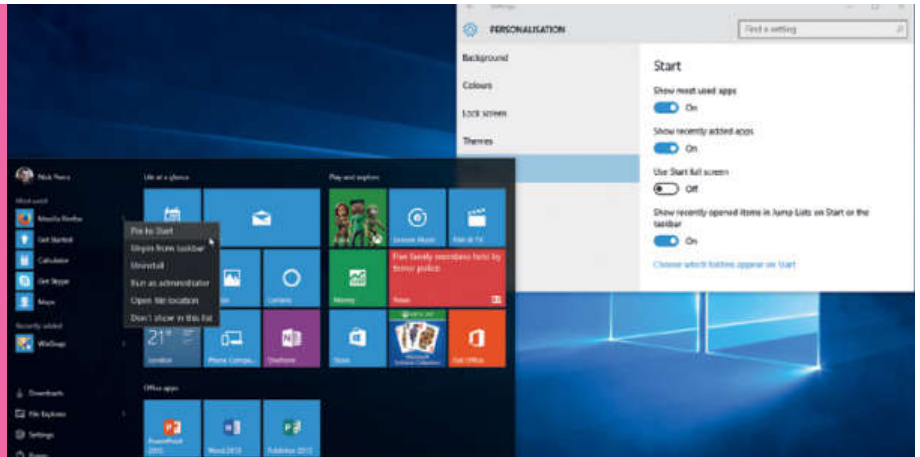
ACCESS CLASSIC DISPLAY SETTINGS

We're not massive fans of the new Personalisation dialogue, which is now part of Settings. If you've a hankering for the Display Settings dialogue from Windows 7 and 8, create a shortcut to it on the desktop: right-click some blank space and choose 'New > Shortcut'. Type the following into the Location box: `control.exe desk.cpl,Settings,@Settings`. Click 'Next', give it a suitable name and click 'Finish', then use this shortcut to tweak display settings.



CUSTOMISE THE START MENU

Alternatively, take the time to make the Start menu your own using the 'Personalisation > Start screen'. Click 'Choose which folders appear on Start' to pin folders to the Start menu. You can also resize the Start menu to alter its height and width – just click and drag on its top or right-hand edge to do so. Drag it to the right to add columns to display more of your tiles on-screen at once. You can then pin apps from the 'All apps' list here (right-click the app and choose 'Pin to Start'), then drag them into groups or whatever order you choose.

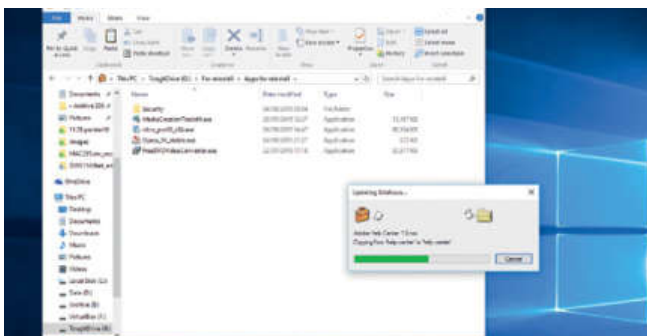
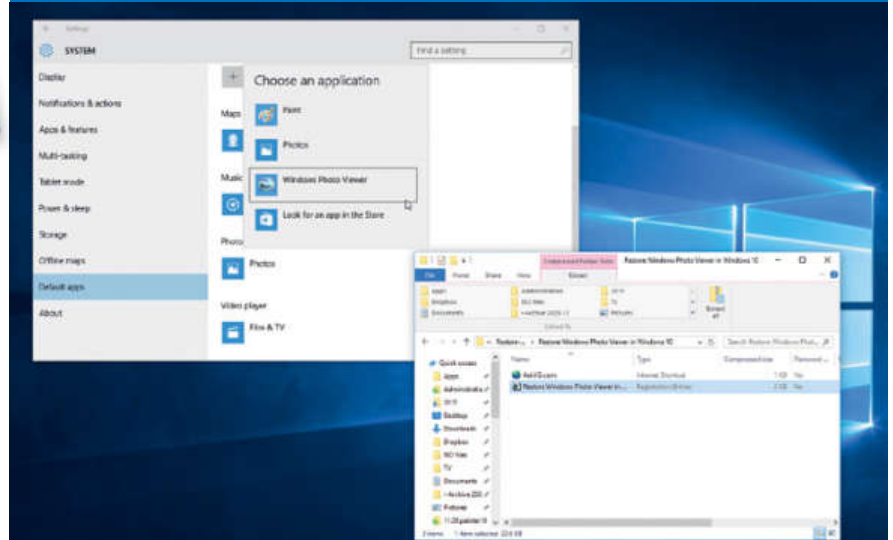


BRING BACK GADGETS

There are many good reasons for leaving Gadgets alone – some can pose a security risk after all – but if you've upgraded from Windows 7 and can't live without them, you can restore them using 8GadgetPack (<http://8gadgetpack.net>), which also works in Windows 8/8.1. Not only does it restore full Gadget functionality, but you gain modern improvements such as support for high-DPI screens, allowing you to resize your gadgets for larger displays.

RESTORE WINDOWS PHOTO VIEWER

Microsoft has replaced Windows Photo Viewer with the Photos app, but it's possible to restore it as an option when setting the default app for photos. It's a convoluted process – see 'Method 4' at www.askvg.com/tip-restoring-windows-photo-viewer-as-default-in-windows-10 but, the site provides a ready-made zip file containing the required Registry entries. Download this to your hard drive, then open it to access the .reg file within. Double-click this and choose 'Run' followed by 'Yes' (twice) to make Windows Photo Viewer an option again.

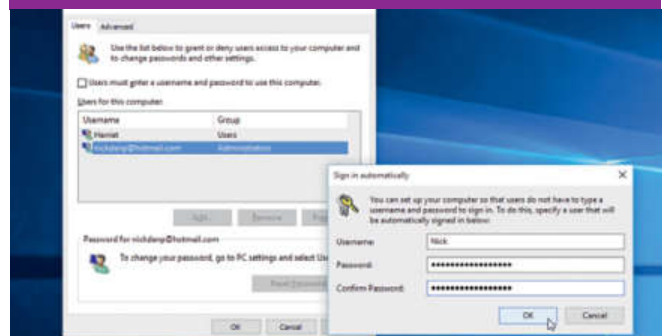


RESTORE BRIEFCASE

It had niche appeal, but the Briefcase was one of the earliest tools for keeping data synced between two locations. While it's been removed from Windows 10 (and 8), you can get it back again with a Registry tweak. Download the required file from winaero.com/blog/wp-content/uploads/2012/09/Briefcase.zip. Double-click it to open it, then double-click Windows 8-Enable Briefcase.reg. Click 'Run' followed by 'Yes' twice, then restart Explorer via Task Manager to restore its features. Note, it doesn't work well with User Account Control, so don't create Briefcases inside any administrator-protected folders.

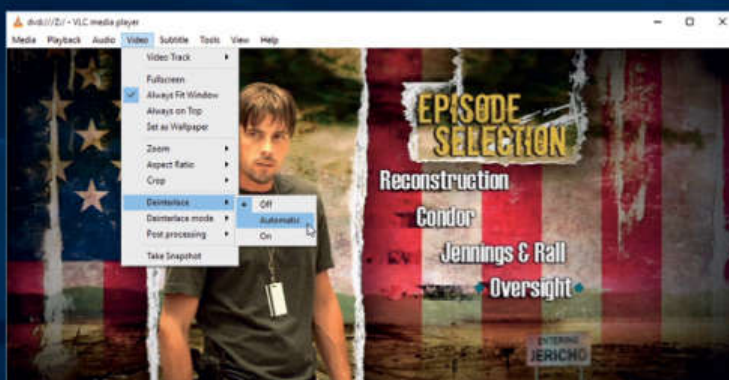
BYPASS LOGIN

If you're the only user of your PC and you'd like to boot straight to the desktop without having to enter your password each time, here's what to do. First, press Win+R to open the Run dialogue box, then type netplwiz and press Enter. Make sure your user account is selected, then untick 'Users must enter a username and password to use this computer' and click 'Apply'. Enter your user password and click 'OK' twice. Windows will also require you to enter your password after your PC wakes from sleep. If security isn't an issue, click 'Start > Settings > Accounts > Sign-in options' and change the 'Require sign-in' dropdown menu to 'Never'.



WATCH DVDS ON YOUR PC

Windows Media Player loses the ability to play DVD video in Windows 10 (as it did in Windows 8 before it). You can purchase Microsoft's Windows DVD Player for \$18.39 from the Store, but why do that when VLC Media Player allows you to watch DVDs — including non-region 2 discs — for free? Just download and install it from www.videolan.org/vlc. Before you play any movies, open the Video menu and choose 'Deinterlace > Automatic' to improve the picture quality.



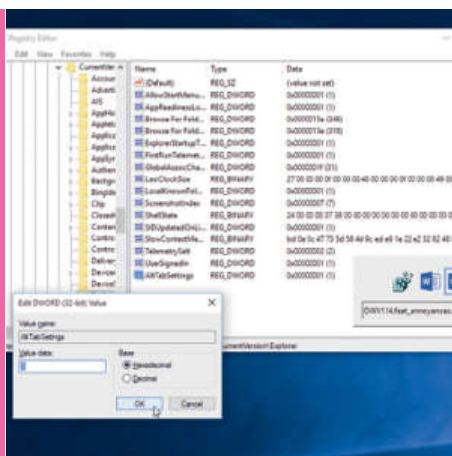
REPLACE WINDOWS MEDIA CENTER

Windows Media Center has also been dropped from Windows 10. There are plenty of free alternatives, but our personal recommendation is Kodi (www.kodi.tv), which also has a built-in DVD player. If you have a TV tuner attached to your PC for watching and recording live television, then you'll also need NextPVR (www.nextpvr.com) along with the CCCP pack (www.cccp-project.net). Visit kodi.wiki/view/NextPVR for a guide to pairing NextPVR with Kodi.



RESTORE CLASSIC ALT-TAB SWITCHER

Press Alt-Tab, and Windows 10 displays a list of thumbnails for all open windows. If you'd rather stick with the old look, press Win+R and type 'regedit' to open Registry Editor. Browse to the following key: HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer. Now select 'Edit > New > DWORD (32-bit) Value'. Name it AltTabSettings. Double-click the value and set it to 1. Now restart Explorer from Task Manager to restore the icon task switcher.

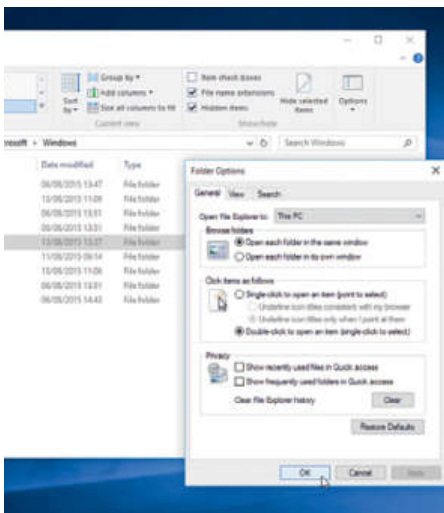


DISABLE WI-FI SENSE

If you connect wirelessly to your network, then the Wi-Fi Sense feature, which connects you to crowdsourced Wi-Fi hotspots and networks shared by your contacts, is enabled by default if you choose Express Settings during the Windows 10 upgrade process. It's designed to make it easier to connect to friends' networks through your Facebook, Outlook.com or Skype contacts list, but if you'd rather not share this information, make sure you disable it. Click 'Start > Settings > Network & Internet > WiFi'. Click 'Manage WiFi Settings' and flick both switches to 'Off' to prevent your network details being shared with others.

TAME QUICK ACCESS

The Quick Access menu replaces both Recent Places and your Favourites folder in File Explorer's Navigation pane, but it can be a bit of a mess, mixing pinned icons, frequently accessed folders and recent items. Open File Explorer, switch to the ribbon's View tab and click 'Options'. You can disable the latter two items via the Privacy boxes, plus instruct File Explorer to open to the This PC view instead of Quick Access if you wish. You can also pin the old Recent Places shortcut to Quick Access too: press Win+R, type '%AppData%\Microsoft\Windows\' and press [Enter]. Right-click the Recent Items shortcut and choose 'Pin to Quick Access'.



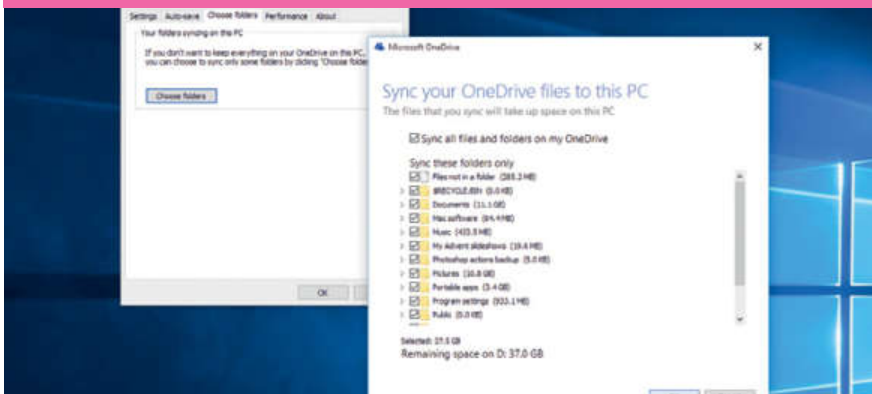
RESOLVE ANY HOMEGROUP ISSUES

A number of people have struggled to connect to their existing HomeGroup after upgrading to Windows 10. Start by running the HomeGroup troubleshooter, which you can access via the HomeGroup Control Panel (type 'homegroup' into the Search box to locate it). If this doesn't yield a solution, Google 'homegroup problems' and click the first result in the list ('HomeGroup problems in Windows – Windows Help'). Work your way through the suggestions underneath 'I can't create, join or use a HomeGroup' – don't worry that it's written for Windows 8; the solutions apply equally to Windows 10 too.



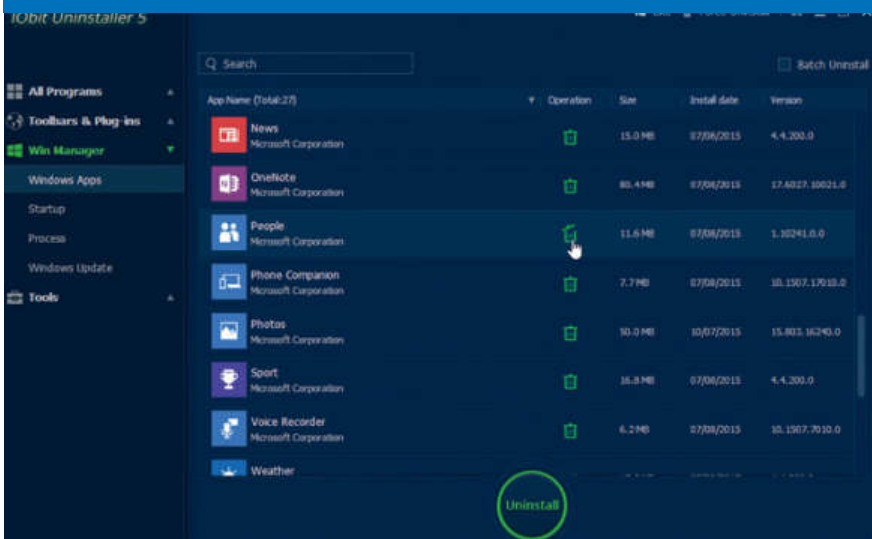
ONEDRIVE CHANGES

One of the best features of OneDrive in Windows 8 was the ability to use 'placeholders' for certain folders, effectively giving you access to your stored files without having to also hold a copy on your hard drive. Sadly Windows 10 ditches this feature (for now); instead you need to specify which folders you want to keep synced on your PC. To do this, right-click the OneDrive icon in the Taskbar Notification area and select 'Settings'. Switch to the Choose Folders tab and click the 'Choose Folders'. Untick 'Sync all files and folders on my OneDrive' and then tick only those folders you need access to.



REMOVE UNWANTED APPS

Windows 10 ships with a number of built-in apps such as Mail, Money and Groove Music. If you don't like any of these, Microsoft doesn't provide an Uninstall option. However, you can still ditch them with the help of IObit Uninstaller 5 (www.iobit.com/advanceduninstaller.php). Once installed, open the app from the 'Start menu > All apps menu', then select Win Manager from the left-hand menu and select Windows Apps. Expand the Windows Apps section where you'll see all the apps listed. Click the dustbin next to one to remove it. Any apps can be restored later through the Store.



RESTORE SOLITAIRE

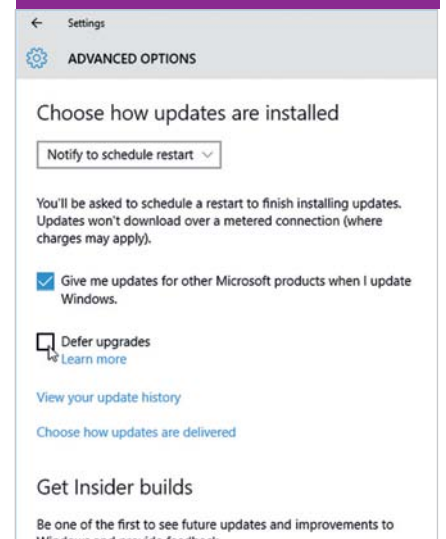
Microsoft has made Solitaire freemium in Windows 10 – you'll need to download the app from the Store, then pay a subscription fee to remove the ads. If this is too much, try Solitaire Collection Free from the Store instead – it's also ad-supported, but you can pay a one-off fee to remove them. If you'd rather play on your desktop, then download 123 Free Solitaire from www.123freesolitaire.com instead – the download you want is the second on the download page. This is ad-free, and comes with 12 games. Configure how it works by clicking 'Game > Autoplay' and exploring 'Tools > Options'.



IMPROVE THE WINDOWS UPDATE

By default Windows Update now delivers all updates automatically. While you can't put them off indefinitely, go to 'Settings > Update & Security > Windows Update > Advanced Options'. Windows 10 Pro users can select 'Defer upgrades' to put off non-security updates for several months. Windows 10 Home users should set 'Choose how updates are installed' to 'Notify to schedule restart' to get alerts that updates are about to be installed.

Home users with Wi-Fi connections can also postpone updates by going to 'Settings > Network & Internet > Wi-Fi > Advanced Options' and flicking the 'Metered Connection' switch to 'On' until you're ready to update.





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Master iOS 9

IOS 9 IS FINALLY HERE, AND IT'S BURSTING WITH DOZENS OF ENHANCEMENTS FOR YOUR IPHONE AND IPAD.

[MATT BOLTON, CHRISTIAN HALL & ALAN STONEBRIDGE]

WHEN A NEW iPhone is on the horizon it's accompanied by a brand new OS to run on it. But, thanks to Apple's Beta Software Program, we've been able to road test iOS 9 for months. It's been through a few iterations, with minor changes, but we've finally been able to explore the finished version and share with you our favourite new ways of getting more from your iPhone and iPad.

iOS 9 has some significant changes to the way you use an iOS device — it runs on all the same devices as iOS 8 — and it's not just cosmetic either. Entirely new apps like Wallet and News replace Passbook and Newsstand, while iCloud Drive finally gets its own app to make it easier to get to your cloud-saved content.

Then there's everyone's favourite voice assistant, Siri, which has been bolstered in iOS 9 with new voice training abilities. Find Siri in Settings and turn on "Hey Siri"; you'll be asked to speak a few things so it gets to know your voice better in five quick and easy steps.

Talking of battery power, iOS 9 makes some major changes to help you get even more hours out of your iPhone. The all-new Low Power Mode turns off parts of the system that aren't absolutely essential, meaning valuable power can be saved to get you through the day.

Over on the iPad some of the biggest changes are focussed on its interface. The fantastic Split View for iPad Air 2 and the recently unveiled iPad mini 4 gives you a side-by-side way to access two apps at once. It's a feature that Windows users will know all about and it's available in OS X El Capitan on the Mac too.

Then there's Slide Over, a great new way to pull in another app for quick access, such as Mail when you're watching a film, or Calendar while browsing Safari, for example.

Beyond these great headline features, we've discovered dozens of other useful improvements which we're sharing with you now. Enjoy!

01 Smarter and faster

CHECK OUT THESE BRILLIANT NEW FEATURES AND IMPROVEMENTS THAT MAKE YOUR IOS DEVICE EVEN MORE PLEASURABLE TO USE.

SEARCH IN SETTINGS

1 At the top level of Settings is a search bar. Type something into it to get a list of matching settings, including the path to reach them, although you can just tap an item to jump straight to it.

DEAL WITH BAD WI-FI

2 If Wi-Fi Assist is switched on at the bottom of 'Settings > Mobile Data', iOS will fall back on your mobile network when it recognises that the Wi-Fi network you're using is doing a poor job of getting you online.

ON-SCREEN KEYBOARD

3 OK, breathe a sigh of relief: letters on iOS 9's on-screen keyboard reflect the case in which you're typing. The top row of the iPad's keyboard contains shortcuts to features such as copy and paste, undo/redo, formatting controls and buttons to attach photos and items in iCloud Drive in apps such as Mail.

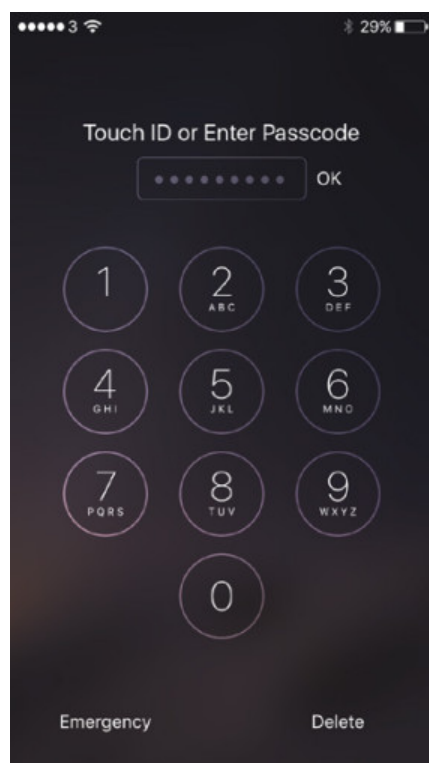
If you type quickly and with high accuracy, the character previews that appear above your finger each time you tap a key can be a distraction. They can be turned off in 'Settings > General > Keyboard'.

BLUETOOTH KEYBOARDS

4 When using a Bluetooth keyboard, the shortcuts bar appears at the bottom of the iPad's screen, along with an option to hide it. When you press 'Command-Tab' on a hardware keyboard, iOS 9 presents an OS X-inspired app switcher that's faster than the touch option. It enables you to reach any of the last eight apps you've used.

TEXT INSERTION

5 Positioning the insertion point just got easier on the iPad. Hold two fingers on the on-screen keyboard and the keys become greyed out. A blue



When setting a passcode, six digits is now the default length. However, additional options enable codes of arbitrary length. One option makes it even harder for someone to guess your code.

vertical bar appears at the insertion point's current location, and you can move it like you would with a mouse or trackpad on a computer by sliding both fingers around the screen; the insertion point will follow. Lift your fingers to finish.

CHOOSE SIRI'S ACCENT

6 Until now, the language you selected for Siri would determine its accent in addition to guiding its expectation of how you say words — but not anymore! If you prefer to have it speak to you in a North American or Australian accent, you can choose that in 'Settings > General > Siri > Siri Voice', which replaces the simpler Gender setting from iOS 8.

TEXT TO SPEECH

7 If you use iOS's ability to read out text that's selected, new voices can be found in 'Settings > General > Accessibility > Speech > Voices'.

NEW ACTIONS

8 New actions for dealing with email attachments enable you to save things to iCloud Drive, or to use Markup to annotate PDFs and images and return that in your reply.

MUSIC

9 In 'Settings > Music' you can choose stream from iCloud and Apple Music in high quality. Maybe disable this if you're on a limited mobile data plan.



Broadly useful new accessibility settings

10 Accessibility features (in 'Settings > General') have been expanded with useful switches that disable features that might get in your way. You can turn off the Shake to Undo gesture, which you might find is too easily triggered. Vibrations from your iPhone can be suppressed, too. Touch Accommodations are intended to assist people with motor difficulties, but you might find them useful for very young children. You can adjust how long the screen must be touched before an action is triggered, treat multiple touches within a duration as one, and set whether a finger's location when it touches or leaves the screen determines your intention.

DEVICE AND DATA SECURITY

11 The next time you set a passcode that unlocks your device, you'll find that iOS 9 wants it to contain six digits — but tap 'Passcode Options' if you still want to use four digits, or to pick Custom Numeric Code. This new option enables passcodes as worryingly short as one character, or much longer than six. As an added level of security, this option stops the Lock screen giving away the length of your passcode, making it harder for people to guess as what is entered is submitted only when OK is tapped.

In 'Settings > General > Auto-Lock' is a new option to lock your device after 30 seconds.

Your website accounts and saved bank cards (in 'Settings > Safari') are now protected by

Touch ID rather than your passcode, provided you have set up Touch ID.

CAMERA

12 In 'Settings > Photos & Camera', you can lock in settings for the resolutions and frame rates used to record regular or slo-mo video. Tap Record Video or Record Slo-mo to choose from the available qualities, which vary between generations of iPhone. There's also some on-screen guidance about how much space a minute of footage at each quality will take up. (Remember, the amount available is shown in 'Settings > General > About'.)



If you prefer to use a Bluetooth keyboard for writing, the experience is much improved now that you can look up common shortcuts. There's an OS X-inspired method for switching apps, too.



02 Search and Safari

TWO IMPORTANT FEATURES ARE NOW MORE POWERFUL THAN EVER BEFORE.

PROACTIVE SUGGESTIONS

13 Where you previously had to type before Spotlight Search showed anything, iOS 9 proactively assesses what you do and when, and uses that to display things you might need right now. The search page also displays online news for your location.

NEWLY SEARCHABLE

14 Many more kinds of item show up in iOS 9's search results. Go to 'Settings > General > Spotlight Search' and you'll see many more built-in apps are listed, including iBooks, Health and Wallet. Third-party apps from the App Store are listed, too. In fact, the rather longer list is indicative of a new capability Apple has placed in the hands of developers, who can make their apps' contents searchable in Spotlight. If you see unwanted kinds in search results, you can hide them here. However, you can no longer rearrange the list to prioritise things or categories.

DISABLE PROACTIVITY

15 If you prefer not to see Spotlight's proactive suggestions, they can be disabled in 'Settings > General > Spotlight Search'. Switch off Siri Suggestions at the top of that page.

DICTATE YOUR TERMS

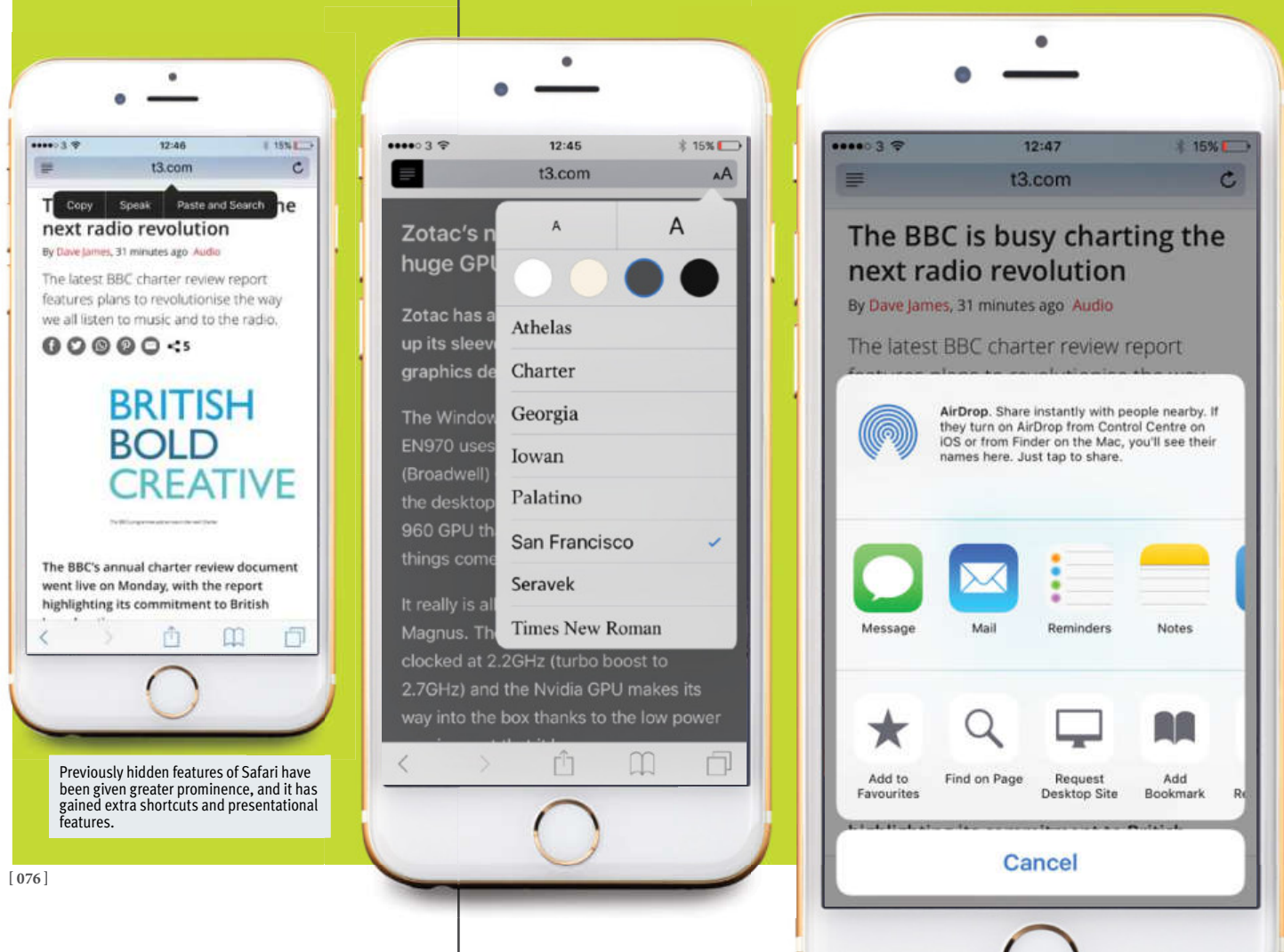
16 There's now a microphone icon at the right of the search bar, which enables you to say what it is you're looking for. This is available even if you've turned off iOS's Dictation feature (which is triggered from the keyboard wherever you can type).

PERFORM CALCULATIONS

17 You needn't dig around for the iPhone's Calculator app to perform basic arithmetic because you can run numbers in Spotlight Search, just like in OS X. An added bonus is that it works on iPad too, even though that device lacks the Calculator app. Type a calculation into the search bar, using * for multiply and / for divide. Try using common functions too — for example, sqrt(144).

ACCESSING SEARCH

18 Prior to iOS 7, the system-wide search feature was accessed by swiping to the left of the first Home screen. Later, Search appeared when you swiped downwards on any Home screen. In iOS 9, both methods work, but there's a subtle difference to note. The latter method opens the search page with the input focus already in the bar and the keyboard visible, and a list of suggested apps even before you type — but nothing more until you do. Use the former route if you want to see iOS's proactive suggestions.



Previously hidden features of Safari have been given greater prominence, and it has gained extra shortcuts and presentational features.

CONTENT BLOCKERS

19 These days, the size of many web pages has become bloated, and often you'll find them slow to load on your iOS device — even over a good Wi-Fi connection. This is due partly to complex scripts often used by online advertising, which take time to run. In iOS 9, Safari includes support for content blockers that can be configured to stop content from certain web domains from loading). You can manage content blockers in 'Settings > Safari'. You'll only see a Content Blockers item listed under the General heading if you've installed an app that adds one (even though the item shows up when you search for it at the top of Settings).

EASIER ON THE EYES

20 Safari's Reader feature, which strips away superfluous content on long pages to give you a cleaner, reformatted view of only the actual content, has a bunch of new visual options. It presents text in the San Francisco font by default, which is the system font on all three of Apple's latest operating systems. The same seven fonts available in iBooks are also available here, along with a choice of page background colours (white, cream, dark grey and black — the third of those is also now available in iBooks). Naturally, the text size remains adjustable.

DO THINGS WITH A PAGE

21 The bottom row of the share sheet contains a couple of new things besides Safari's Request Desktop Site. Add to Favourites, which was previously tucked away with Request Desktop Site, is found here, along with a more explicit Find on Page action as a convenience for anyone who is unaware of the existing, more hidden route of tapping the search field and then the last item in its suggestions.

PASTE AND GO

22 It takes fewer steps to paste and go to a web address that you've copied to the Clipboard. Hold a finger on the field and tap 'Paste and Go' in the options bar when it appears. With something else on the Clipboard, you'll get a Paste and Search option instead.

UPLOAD FILES

23 Got a CV to upload as part of a job application? Wherever you see an option to upload a file to a site, you'll find iCloud Drive among the sources from which you can attach and submit a file to an online form.



Request Desktop Site

24 In iOS 8, the option to load the desktop version of a website was tucked away where it was easy to miss. There are now two ways to reach it. The long-winded way is to tap the Share button and then Request Desktop Site in the bottom row of actions. However, it's quicker to hold a finger on the reload arrow in the address bar for a moment, then tap Request Desktop Site when it appears.



Spotlight Search is a lot smarter in iOS 9, and it even saves you having to search for the Calculator app because you can give it arithmetic expressions.

03 Notes and Reminders

IMPORTANT LITTLE DETAILS THAT YOU JOY DOWN ARE MUCH SMARTER AND RICHER.

PERSISTENT REMINDERS

25 Due reminders on the Lock screen remain there unless you actively action them — if you unlock and then lock your phone, your reminders will still be listed on the Lock screen.

MORE RESPONSES

26 When you do action a notification, you have more options than before: you can mark something as completed, or you can choose the Later option, which gives you the choice of ‘snoozing’ the reminder.

CREATE REMINDERS

27 While in an app, you can tell Siri to “Remind me about this” and it will create a reminder named after whatever you’re currently looking at in the app. You can also send things to Reminders from apps such as Safari by tapping the Share button, then Reminders. Here, you can add text and, by tapping the Options button, set a time or location to be reminded. In Safari’s case, when you access that reminder, it will take you straight to the linked web page.

ENHANCED NOTES

28 In the new, richer Notes app, you can embed pictures or web links into your notes. The easiest way to do this is often from Safari or the Photos app — tap the Share button, then choose Notes. You’ll have the option of adding text to go with your link or photo, and choosing whether to create a new note or add to an existing one. Pictures can also be added using the camera icon above the keyboard inside the Notes app (if this isn’t visible, tap the + on the right to reveal it).

MAKE CHECKLISTS

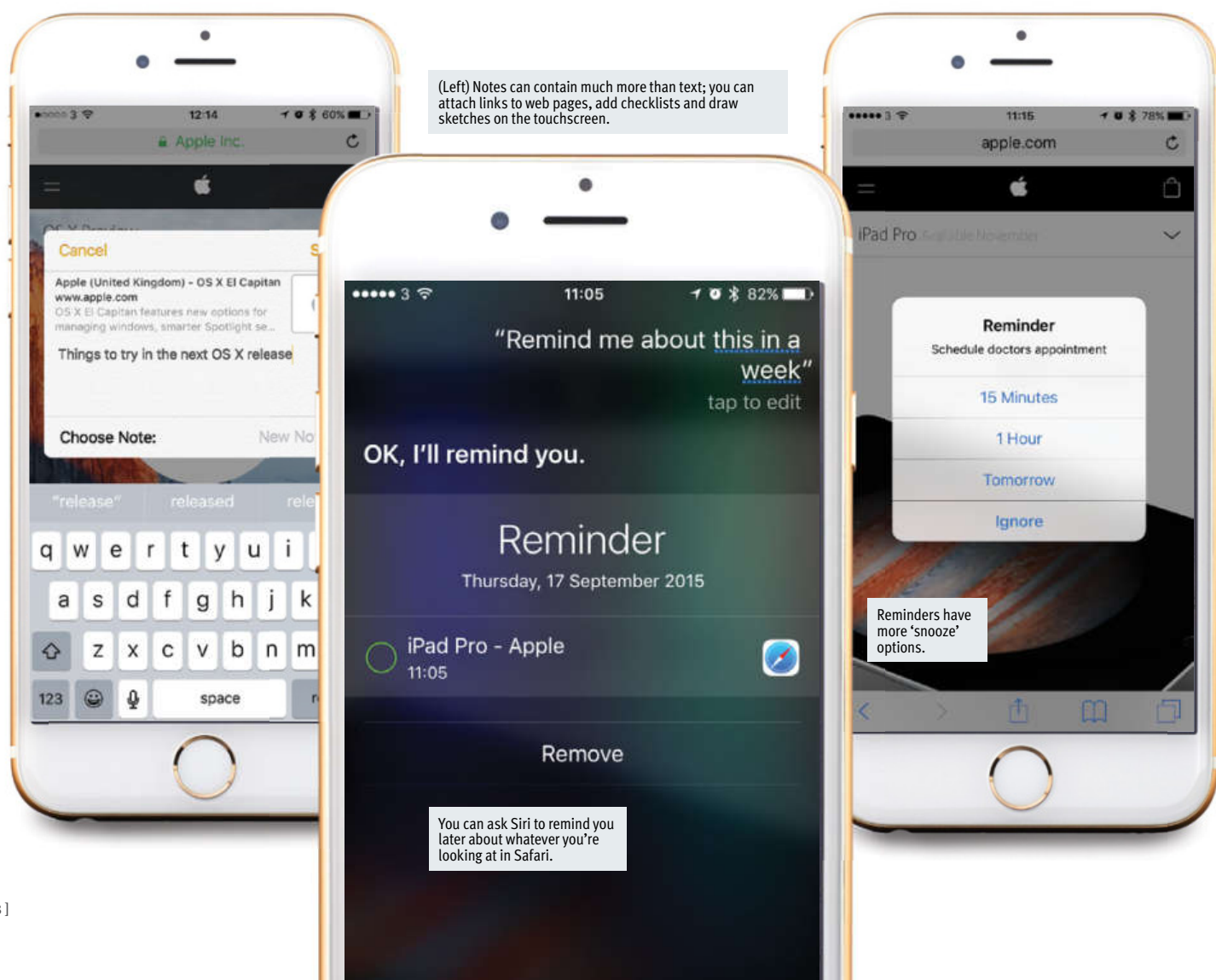
29 You can add checklists to notes, too — tap the icon of a circle with a tick inside, just above the keyboard. Type your first to-do, then press return to start a new one. Press the icon again to stop. To mark an item in the list as done, tap its circle.

SKETCH OUT IDEAS

30 Tap the squiggly line icon above the keyboard in Notes to add freehand drawings and use a ruler tool to draw straight lines. You can choose different drawing implements and line colours. There are undo and redo options, and you can rotate the whole drawing for easier working. Tap Done to insert it.

TEXT STYLING

31 The Aa icon above the keyboard in the Notes app lets you style up text in notes as headings, subheadings and lists. Highlight text and choose a new style for it, or start a new line and choose a style before writing. Highlight text and then tap BIU in the pop-up options bar to change its weight and decoration. You can indent the current line or selection from the same pop-up.



(Left) Notes can contain much more than text; you can attach links to web pages, add checklists and draw sketches on the touchscreen.

Reminders have more ‘snooze’ options.

You can ask Siri to remind you later about whatever you’re looking at in Safari.

04 Multitasking

WORKING WITH MULTIPLE APPS JUST GOT A WHOLE LOT EASIER.

PICTURE IN PICTURE

32 On any video that uses Apple's default video player, tap the button that shows two rectangles and an arrow. This turns the video into a small floating box, which can be moved to any corner, resized using two fingers, and stays open even if you change apps. Flick it off the left or right of the screen to temporarily hide it (it will keep on playing).

WORK IN TWO APPS AT ONCE

33 Split View lets you run two apps side by side — but only on an iPad Air 2 and iPad mini 4. To use it, start with the same gesture as Slide Over, let go, then drag the vertical line on the divider to the middle of the screen.



At last, you can work in two apps side by side, which is great for researching in Safari and taking notes alongside. However, this feature is only available on the iPad Air 2 and iPad mini 4.

RETURN TO AN APP

34 When you switch apps through an action such as tapping a notification, you'll see a 'Back to...' button at the top-left corner of the screen.

NEW APP SWITCHER

35 The App Switcher has a new look. Recent contacts are gone, but Handoff is more prominent in a bar at the bottom — tap it to receive a task.

DIP INTO APPS

36 Slide Over enables you to bring up a thin view of another app (which must support it) by sliding a finger inwards from the right edge of an iPad's screen, so you can attend to things without stopping what you're doing. To switch apps, swipe down from the line at the top of the right pane.

05 Battery and storage

IOS 9 HAS GREAT NEW WAYS TO MANAGE YOUR DEVICE'S STORAGE AND BATTERY

CONSERVE POWER

37 Smartphones are power hungry, there's no way around that with bright touchscreens and plenty of apps running. But it's good to see Apple turning its attention to battery management proper. Low Power Mode disables certain aspects of your iPhone, including background app refresh, so you don't have to go around turning off features any more. It can extend usage by a few hours, and kicks in (as an option offered in an alert) when your iPhone reaches 20% of its battery capacity. The battery meter at the top-right of the screen turns yellow to indicate Low Power Mode is enabled. The feature can be turned on manually at any time in Settings > Battery.

MANAGE YOUR USAGE

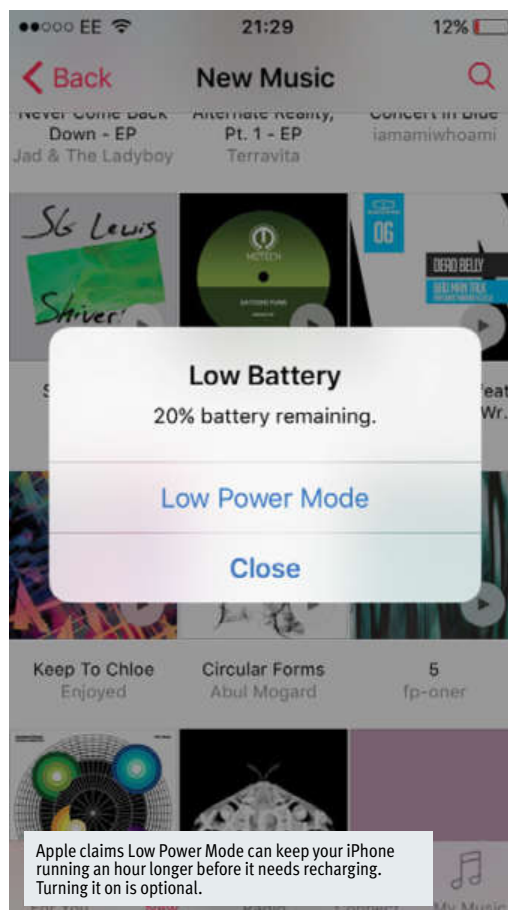
38 In Settings > Battery, you can view what hogs the battery. There are two options, Last 24 Hours or Last 7 Days. They display the proportion of battery life used by each app in that time. Tap the clock icon on the right to see the duration that apps were using battery, both while on-screen and in the background.

EXITING LOW POWER MODE

39 You can turn off Low Power Mode manually, of course, in Settings. However, when battery power reaches 80% on charging your device, Low Power Mode will be turned off automatically, returning your iPhone to full throttle.

MONITOR BATTERIES

40 Among a slew of subtle changes to Notification Center, on an iPhone only you can check battery statuses in the Today view. The Batteries widget shows power levels of your phone and Bluetooth accessories, such as headphones or an Apple Watch. To enable it, scroll to the bottom of the Today view, tap Edit, then tap the + next to the widget's name. The Batteries widget is not available if a Bluetooth accessory is not paired with the iPhone.



Apple claims Low Power Mode can keep your iPhone running an hour longer before it needs recharging. Turning it on is optional.

06

Other apps

BEYOND THE BIG CHANGES, THERE ARE PLENTY OF SUBTLE ONES TO DISCOVER.

NEWS AND NEWSSTAND

41 News is a brand-new app that provides timely information in a single place, much like you might once have caught up with website updates in an RSS reader. However, it comes with its own publishing format that enables the use of animation and other engaging interactions. At launch, it's geared towards the US, but it's expected to launch in Australia soon after.

If you read digital editions of *TechLife* or other magazines, you might wonder what News means for them. Newsstand is gone in iOS 9 — sort of. If you already had magazine apps, Newsstand will have been converted to a regular folder, and apps can be moved out of it. Future magazine downloads go straight to the Home screen.

WALLET

42 Wallet is the new name for Passbook. It still contains your passes for airlines, hotels and other services, and bank cards registered to use with Apple Pay. To make accessing these things more convenient, go to 'Settings > Wallet & Apple Pay' and ensure the Home button shortcut is switched on so you can double-click the button to open Wallet while your iPhone is locked.

PHOTOS

43 When viewing a photo full-screen, a strip across the bottom of the screen shows other images in the same album, collection or moment. Swipe across it to quickly browse through them.

In the Photos tab, tap Select then drag your finger from one photo to another to select them and those in between, rather than having to tap each one you want in the selection.

Rather than reaching for the back arrow at the top-left of a full-screen photo to return to its album, swipe downwards to dismiss the picture. This is particularly handy on larger iPhones.

If you put screenshots on social media, as some of our friends do, you'll be ecstatic that iOS at last adds them to a Screenshots album,

making them much easier to clear out of your library later on. There's a Selfies album too, but it isn't powered by intelligent face detection; any photo taken with the front-facing camera appears in this album.

Rather than tapping and holding on a photo for an option to hide it, you must now tap Select, tap a photo, then the Share icon and find the Hide action in the bottom row of the share sheet. That takes a little longer for a single photo, but the advantage is that you can select additional photos in the share sheet and then hide them all at once.

MAPS

44 The latest step in Apple's attempts to bring Maps up to scratch is the inclusion of public transport data to help you get from A to B, rather than just driving and walking directions. Previously, Apple made it so third-party transit app developers could plug into Maps, but now it's starting to add its own data to the app by default, including details of problems on your route, like it does for driving directions. However, transport data is available for a limited number of cities at present, which is pretty normal as similar localised services grow.

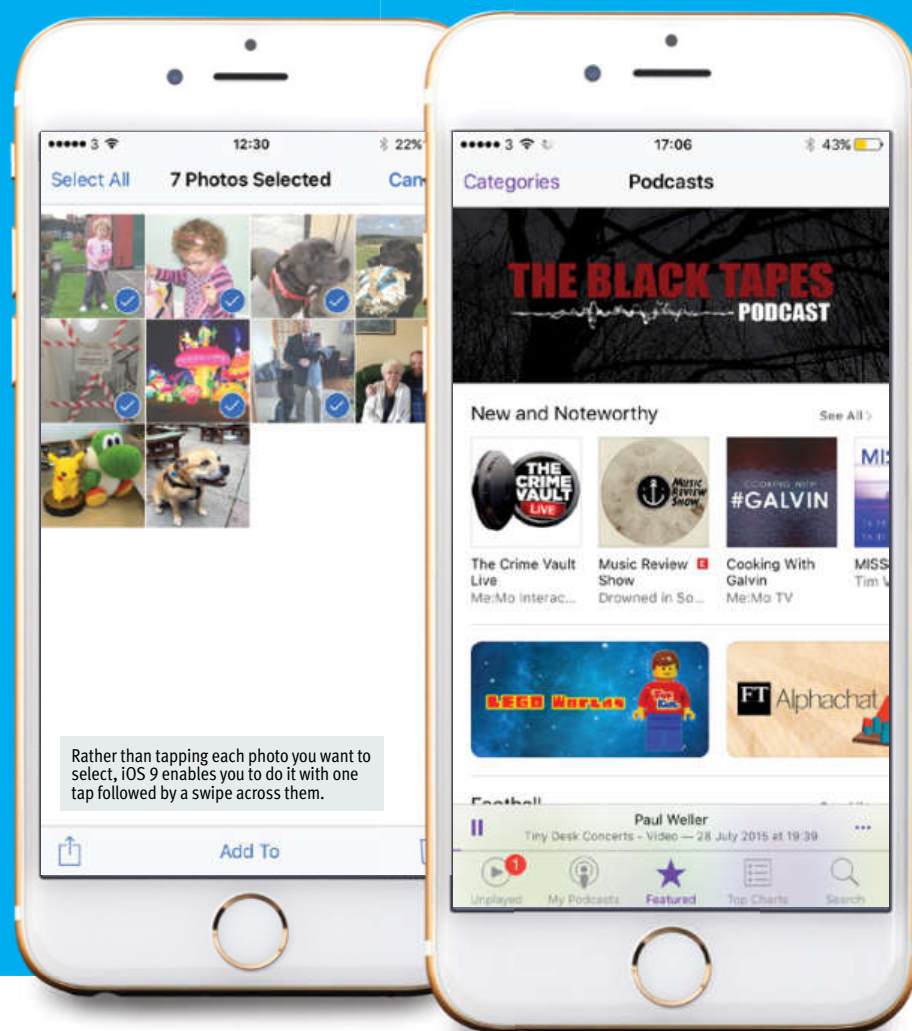
Tap the Transport tab while plotting directions and the app will try to use Apple's own data before suggesting you look at transport apps in the App Store. Tap the 'i' at the bottom-right and switch to the Transport view. In all three views, a '3D' badge next to a city indicates you can take a Flyover tour of it. Zoom out in the Transport view and other badges will indicate where public transport data is available.

PODCASTS

45 Podcasts has been given a makeover to be more consistent with the Music app added in iOS 8.4. Music's MiniPlayer — a bar above the tabs at the bottom when something is playing — is replicated, as is the use of an ellipsis (...) to indicate more options for an adjacent item.

The My Podcasts and My Stations tabs have been consolidated under the former, and the new Unplayed tab is more immediate in showing what you need to catch up on.

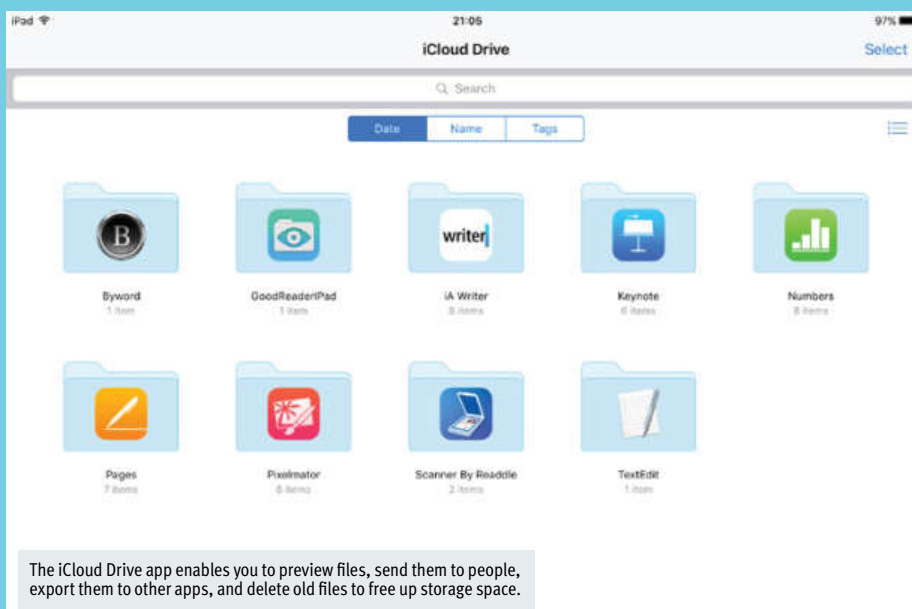
More detail is shown in the Top Charts tab (star ratings and the date of each podcast's most recent episode) but some control has been sacrificed; categories in Featured and Top Charts no longer have subcategories.



07

The iCloud Drive app

THE DOCUMENT PICKER IS NOW FOUND IN A DEDICATED APP, ENABLING ACCESS TO YOUR FILES ON ALL YOUR DEVICES.



The iCloud Drive app enables you to preview files, send them to people, export them to other apps, and delete old files to free up storage space.

FIND THE APP

46 iCloud Drive is Apple's storage solution for managing file syncing between your Mac and iOS devices, but until now it has been very much 'in the air' because there's been no easily visible hub for it on the iPad and iPhone. But for iOS 9 Apple built an iCloud Drive app, holding all your iCloud Drive files in one easy to access area. However, the app doesn't automatically appear when you upgrade your device to iOS 9. It has to be enabled in 'Settings > iCloud > iCloud Drive > Show on Home Screen'.

VIEW YOUR DRIVE

47 When you tap the iCloud Drive app's icon, you'll see the Document Picker (a grid of the folders and files within your cloud storage). Previously, this only appeared in compatible apps, rather than its own app. At the bottom of the screen, you can see how many items are in the current folder, and how much space you have available in your iCloud Drive.

DEALING WITH FILES

48 iCloud Drive in iOS 9 tries to mimic the folder and file experience you get on your Mac. Tap on any file to view it. You can also create new folders and move files to different locations, as you would expect. The iCloud Drive app has brains too; if you select a series of files in a folder that doesn't have any subfolders and then tap Move, the app will automatically determine whether you need to create a new folder and prompt you to enter a name for it. If you already have one or more subfolders, the app shows you a list of them to choose from.

EDIT A DOCUMENT

49 In order to make changes you have to export the file to a different app. Tap the Share button (top-right) and then

select the app you'd like to export the file to. You'll be redirected to that app, where you can edit it fully. Depending on the file type, some of your formatting preferences, like fonts, might be different. Every change you make will sync back to iCloud. Rename a file by holding a finger on it and choosing Rename. This works for nested folders, too.

PREVIEW A FILE

50 The app also allows you to preview files within your iCloud Drive. It only knows how to display a handful of file types, but it can display text documents. You can also access the Sharing sheet to send the file to other people in an iMessage, email, or as an attachment in other messaging apps.

CHANGE VIEW

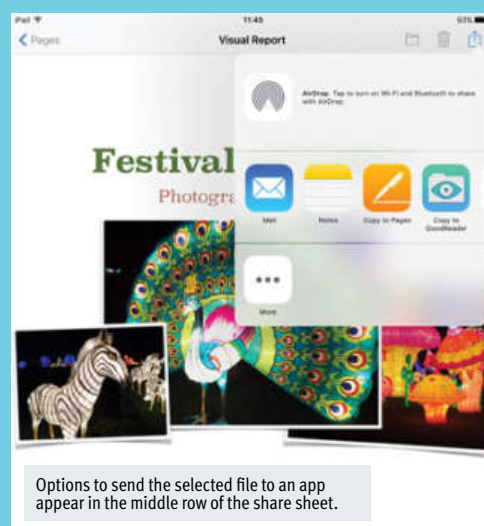
51 You don't have to stick with the large folder view shown above. Click the List Menu (the icon that shows three horizontal lines) to get a list view instead. If you don't see the icon, it's because you need to swipe down slightly on the main screen to reveal it — it's under the search area.

TIDY UP YOUR DRIVE

52 One of the most useful things you can do with the iCloud Drive app is organise your files and delete the ones you don't want. If you want to delete files, tap on Select in the top-right corner, and then tap on the files you want to get rid of. Next, tap Delete, then the red text that says 'Delete from iCloud Drive'. The app will warn you that the action cannot be undone.

SEARCH ICLOUD DRIVE

53 Don't forget that iCloud Drive is fully searchable. The search bar is always visible near the top of the iCloud Drive app. It searches as you type so you will get to your files in seconds. ■



Options to send the selected file to an app appear in the middle row of the share sheet.



You can preview files that iOS can read without leaving the app, but not all files copied to iCloud Drive from your Mac will open.

HELP STATION

GET THE MOST FROM YOUR TECH

[THIS MONTH IN HELP STATION]

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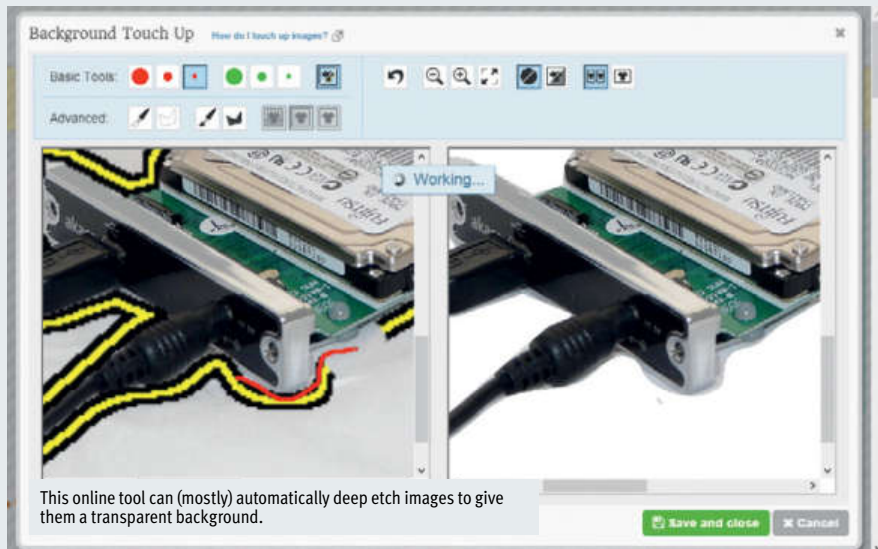
Home AV

AV POWER AMPLIFIERS:
WHAT AND WHY?

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Tech frontiers

YOU'RE MY POWERWALL



[PHOTO EDITING]

Make an image
transparent

Is there a tool I can use to quickly remove plain-coloured backgrounds from my images prior to uploading to the web?

[RICHARD TURNER]

Matt Hanson replies: One of the best free apps for this is Bonanza.com's online Background Burner tool. The steps below explain how to remove an unwanted background from a single image — note that a paid-for version exists for working on multiple photos at once.

1. Upload and process. Visit bonanza.com/background_burner in your browser. Drag your

image into the space provided, or click 'Choose file' to select it manually. Wait while the file is uploaded and Background Burner attempts to make it transparent.

2. Select best result. A number of thumbnails will be generated based on different attempts to make the image transparent. If you're lucky, one will be perfect — click 'Select' beneath it and jump to step four; otherwise, click 'Touch up' next to the best one.

3. Fine-tune your image. Zoom into the imperfect part of the image, then click a red button and click and drag over parts of the image you wish to remove. Use the green buttons to choose parts of the image to restore. There's an undo button for mistakes!

4. Final steps. Getting the selection just right often involves taking bits away, then adding other bits back. Once you're happy with your picture, click 'Save and close'. You'll need a free account to download your image; you can replace the background too.

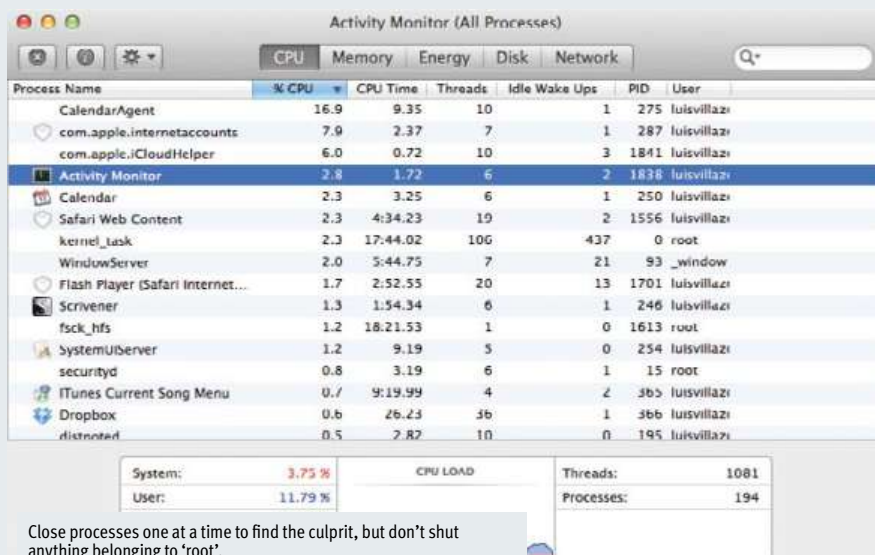


[MAC]

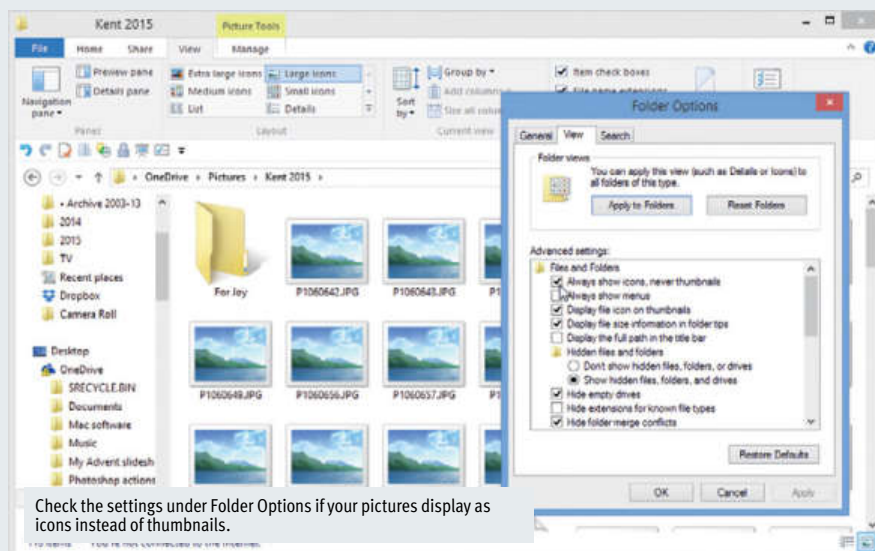
Mysterious blank
patch on screen

I moved house recently, and while setting my Mac up I hadn't put the Thunderbolt cable for the second screen in securely. It slipped out, and when put back in there was a large black window across most of the two screens. If I have open applications in front of the black area, they're fine unless I click on the black window. Then they disappear behind it. I've tried Force Quit, but only the other open apps appear in the list.

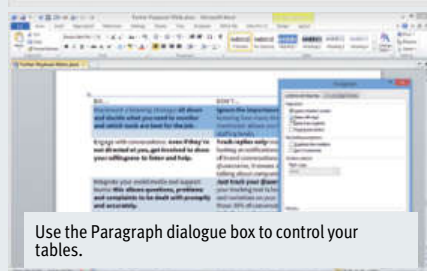
A partial workaround is to shut down with



Close processes one at a time to find the culprit, but don't shut anything belonging to 'root'.



Check the settings under Folder Options if your pictures display as icons instead of thumbnails.



Use the Paragraph dialogue box to control your tables.



'Get Windows 10' will flag any compatibility problems prior to upgrading from an older version of Windows.

'Reopen windows on restart' unchecked. However, the next time I shut down with 'Reopen windows on restart' checked, it reappears. Any help?
[STEVE MAPSTONE]

Luis Villazon replies: Well... this is a weird one. Black rectangles on the screen can sometimes mean faulty RAM, and during a house move it's not uncommon for RAM modules to come loose. But if the RAM were loose or faulty then you'd have a permanently dead area on the screen, not one that you can slide applications over.

Just because you don't see an application in the Force Quit list that appears when you hit Command-Option-Esc doesn't mean you don't have something running. Try opening Activity Monitor and use the X icon in the top-left to close each process that shows your login name in the 'User' column. If the black rectangle disappears at any point then you have a buggy app that's displaying a blank window somehow.

I think it's more likely that the saved window state has got corrupted. This will have been completely unrelated to your loose cable – that was a coincidence. Deleting ~/Library/Preferences/com.apple.loginwindow.plist and restarting ought to be enough to cure this. If for some reason it isn't, then you may have to escalate to a full reinstall. Back up your data and documents, and do a clean reinstall from the Recovery partition. Don't restore your entire disk directly from Time Machine, because you risk restoring whichever corrupted preference file is responsible. Restore apps one at a time or download them afresh, to be on the safe side.

[WINDOWS] How do I restore photo thumbnails?

Can someone please tell me how to restore the photo previews that appear when browsing my folders in Windows 8.1? All I'm seeing is the flower icon next to each photo.
[KEN PAYNE]

Nick Odantzis replies: This can usually be fixed by tweaking a single setting. Click the folder button on the Taskbar to open a File Explorer window. Switch to the View tab on the ribbon and click the 'Options' button on the right, to open the Folder Options Control Panel. Switch to the View tab on here and check the 'Always show icons, never thumbnails' setting at the top. If it's ticked – as it was in Ken's case – remove the tick and click 'OK', which will restore the thumbnail view.

[OFFICE] Break tables across pages in Word

I'm putting together a book on the history of my old sport, with an appendix of championship results from 1966-2000. The Word 2007 document is 95% tables, and my problem is that many of the tables start at different places on the page and sometimes split in the middle of the table when flowing on to the next page. What are my options for keeping things reasonably neat?
[GILL FREEMAN]

Nick Peers replies: I took a look at Gill's tables and came up with three possible solutions: first,

start each championship's results on a new page. With some tweaking of line spacing, as well as the spacing between each table, it may be possible to restrict each championship to a single page. Second, try inserting a manual page break between each sub-section, for example at the end of a table of medals for a particular category. The third option is to simply ensure a break occurs between tables, so the text flows smoothly and while there may be breaks between categories, each individual category will be kept together on one page.

The tools you'll need to investigate all these options are found in the Paragraph dialogue box. Make sure you select the relevant parts of your table before switching to the Home tab and clicking the small arrow button on the Paragraph group to open it. Use the Spacing section on the Indents and Spacing tab to experiment with spacing, and Line and Page Breaks tab to control how the table breaks across pages. See wordribbon.tips.net/T012975 for a more details.

[OFFICE] Office 2000 and Windows 10?

I'm currently running Windows 7 Home Premium with Office 2000 Professional. I've reserved my free download for Windows 10, but haven't upgraded yet because I want to confirm that all my current programs – including Office 2000 – will be unaffected by the upgrade. Is there a way to check this?
[ALAN WYNWARD-SIMPSON]

Graham Barlow replies: Sadly Office 2000 isn't compatible with Windows 10 – or indeed Windows 8 before it. However, the good news is if you can't afford an upgrade to Office 365, then there are a number of free Office alternatives available to you. Kingsoft Office Suite Free 2013 (kingsoftstore.com) is a good choice if you only need the core applications – word processor, spreadsheet and presentations – tool – and are happy to use the same ribbon interface found in Office 2007 or later.

If you'd rather stick to the old menu-based system employed in Office 2000, then LibreOffice (libreoffice.org) is the best choice. This also offers a database plus drawing and maths tools in addition to the core programs.

To verify that your other apps will work in Windows 10, right-click the Windows logo in the Taskbar Notification area and choose 'Get Windows 10'. Click the hamburger like icon in the top left of the window to reveal a menu, and click the first option underneath the 'Getting the upgrade' section, which may read 'Your PC is ready' or 'Check your PC'. This will list your PC's readiness for Windows 10, complete with any known compatibility issues you may need to address. ■



[POP THE HOOD]

Monitor your Mac's activity

THE BEST UTILITIES TO KEEP AN EYE ON THINGS AND HELP WHEN THINGS GO WRONG

[CRAIG GRANNELL]

CHANCES ARE IF you took your Mac out of the box when you got it home, powered it up, and then never installed anything on it and never went online, things would rarely go wrong. Also, you'd probably be very bored. But once you add anything on top of vanilla OS X, the potential for problems rapidly increases. Software can clash with the operating system or other software, websites and apps can cause network issues, disk space can run out, and processes can run riot, causing your Mac's fans to go into crazy mode. Furthermore, hardware can and does invariably — if rarely — fail. So what we're saying is that your Mac is essentially a sleekly designed and very stylish time bomb, waiting for the day when it'll quietly detonate, not so much with a bang, but with a "not working so well today – sorry".

If you're quietly panicking, don't. Most problems can be fixed, and we provide ideas about how to do so later in this tutorial. Moreover, issues can be headed off at the pass. Rather than reacting to problems after they've occurred — frantically trashing files if you abruptly run out of disk space; realising you

have precisely no charged batteries when your mouse, trackpad and keyboard conspire against you by simultaneously stating they're out of juice — it's smarter and more efficient to get some advance warning. What you need is monitoring tools which lurk in the background, patiently probing your Mac, and enabling you to poke around facts, figures and data as you see fit.

BUILT-IN TOOLS

Apple bundles some handy tools with your Mac. Visit the Network and Bluetooth panes in System Preferences. Each has an optional menu bar extra that can be activated, enabling you to check on the status of the relevant type of connectivity. With Bluetooth, you'll see a battery indicator if one of your connected accessories is running low on power, giving you ample time to find new batteries. Clicking the menu extra lists the devices, and clearly shows which one needs attention; dipping into

the sub-menus details charge levels. As for the Wi-Fi menu extra, it provides a straightforward visual indication of when your network connection is flaky. Once connected, it should remain a solid black. If it keeps flicking to grey and back, and you're in a place where the network connection should be

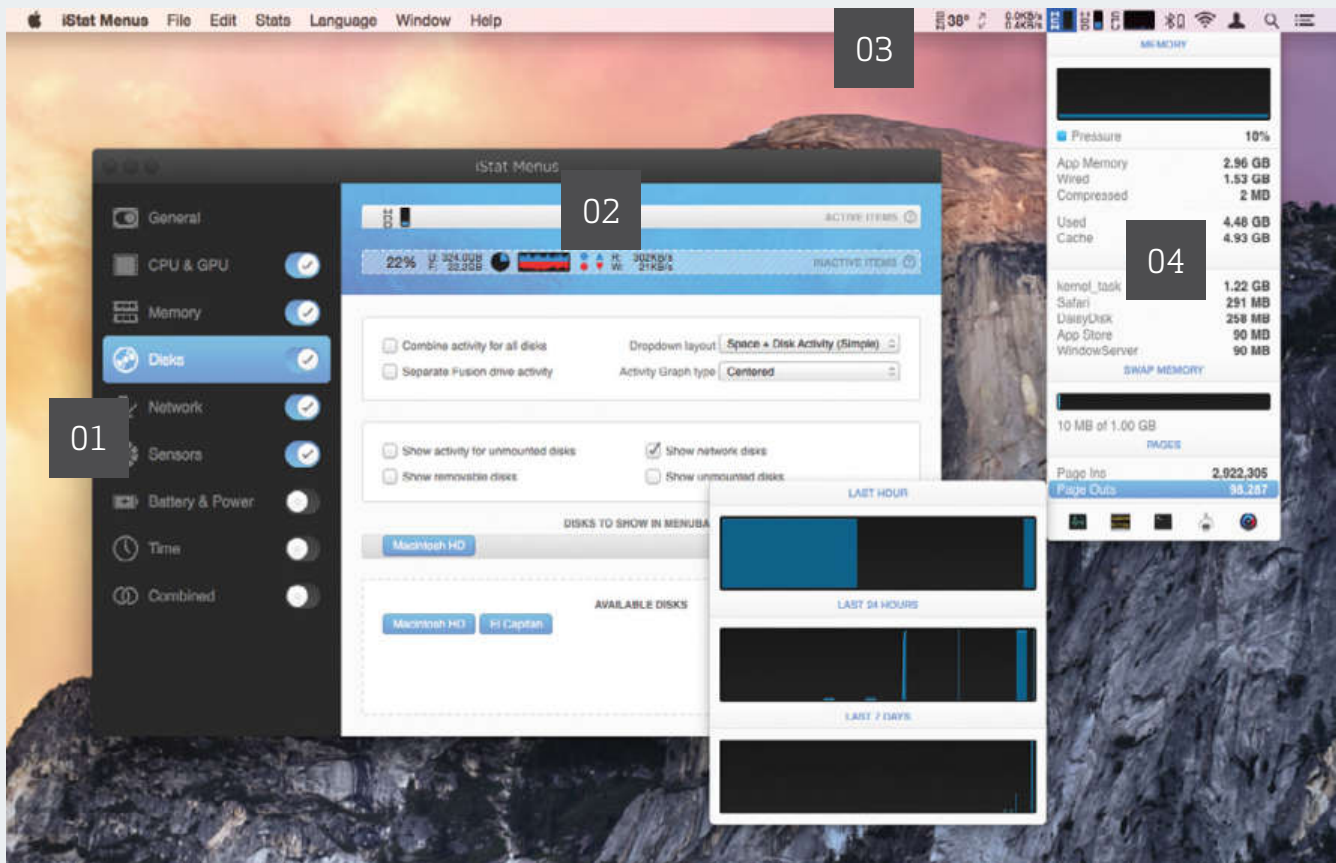
solid, you might need to think about running some diagnostic checks. (Note that should you quickly need additional details about your current network settings, Option-click the Wi-Fi menu extra. The information in

the menu will then be rather more involved.)

Plenty of third-party tools exist for similar and additional scenarios. Some are quite specialised. TG Pro (US\$15 – about \$21, tunabellysoftware.com) monitors temperatures in your Mac (the 'TG' stands for Temperature Gauge), finds faulty sensors and gives you the option to control fan speeds. (If you're lacking funds to spend on an app, also

ONCE YOU ADD
ANYTHING ON TOP
OF VANILLA OS X,
THE POTENTIAL FOR
PROBLEMS INCREASES

A QUICK LOOK AT ISTAT MENUS



MAIN WINDOW

01 The app's main window is used to explore and adjust set up options. Select General or a module from the sidebar to start.

MODULE SETTINGS

02 Each module has its own options. Typically, you can drag items between the active and inactive areas, and set which sensor output is shown in the menu bar.

MENU BAR EXTRAS

03 All items ticked in the app's sidebar will be displayed in the menu bar as graphs or stats that periodically update.

FINER DETAILS

04 Click a menu item for details. In many places, you can put the pointer over info to see more.

consider the free Macs Fan Control (crystalidea.com). Generally, we don't recommend messing with Apple's default fan settings, but it's worth having the option in mind if your Mac's getting very hot, and being able to do something about it if you've got days to wait for a Genius Bar appointment.

Things like CPU, memory and network statuses are perhaps more useful in an immediate sense. If one of those things starts going haywire, you might be able to respond appropriately before it's too late.

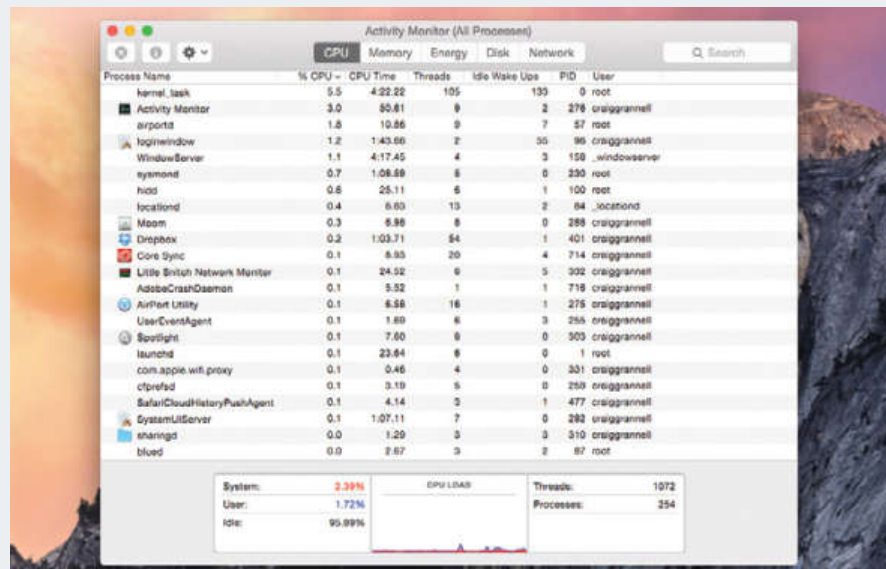
When problems do occur, you need to figure out what's happening before working on

a plan of attack. Common issues with Macs include sudden sluggishness and/or unresponsiveness, network connectivity slowdowns or dropouts, and a lack of onboard storage. Sometimes, you'll find one problem leads to another. For example, if your Mac has essentially no free space remaining on the

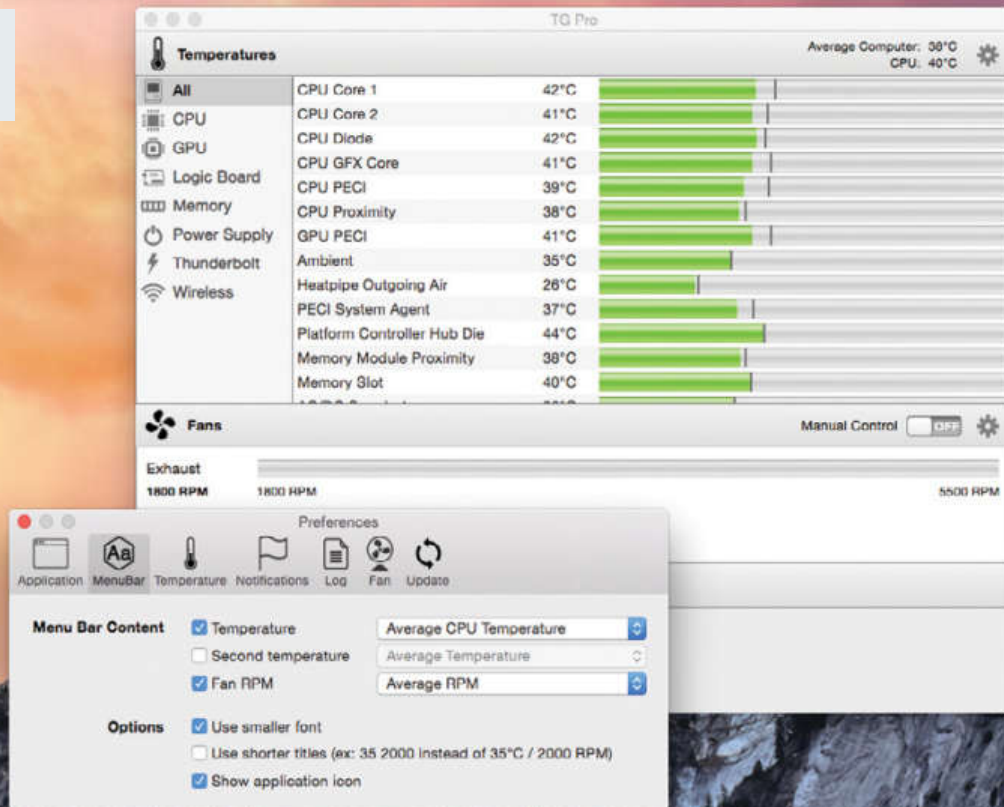
SYSTEM MONITORING

Elsewhere, the utilities tend to be modular bundles that perform various tasks. Monity (\$6.49, Mac App Store) is an affordable utility designed to monitor CPU usage, network activity, batteries, and disk usage that enables you to drop into Notification Center at any time to see how things are going.

Our favourite product of this kind, though, is iStat Menus (US\$18 – about \$25, bjango.com). This comes in the form of an app that's essentially a bunch of settings that control a bunch of icons that reside in the right-hand side of the menu bar. These icons are highly configurable in terms of appearance, but mostly take the form of tiny graphs. You get more than ample warning about the capacity of your Mac's storage, given that the relevant bar increases in size over a matter of months.



TG Pro monitors temperature in Mac components, and it can adjust fan speeds.



volume where OS X is installed, apps will find it much harder to function, which can result in slowdowns and responsiveness problems. But if your cursor's jerking about or it feels like you're wading through digital quicksand with every step, that doesn't necessarily mean that

low storage space is the problem.

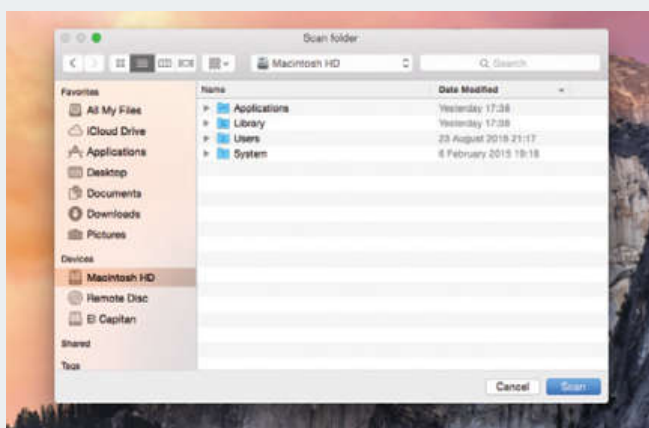
FIXING YOUR MAC

A good first step is to check in Apple's own Activity Monitor tool, which you'll find in /Applications/Utilities. Here, you can click the

tabs to peruse resource usage on your Mac in terms of CPU, memory, energy, disk and network. Sometimes, an app will get stuck, and you'll see the CPU load graph maxed out. Similarly, your Mac may run out of memory, causing the memory pressure graph to look

[STEP BY STEP]

HOW TO SCAN YOUR MAC FOR HUGE FILES



01

START SCANNING A DRIVE OR FOLDER

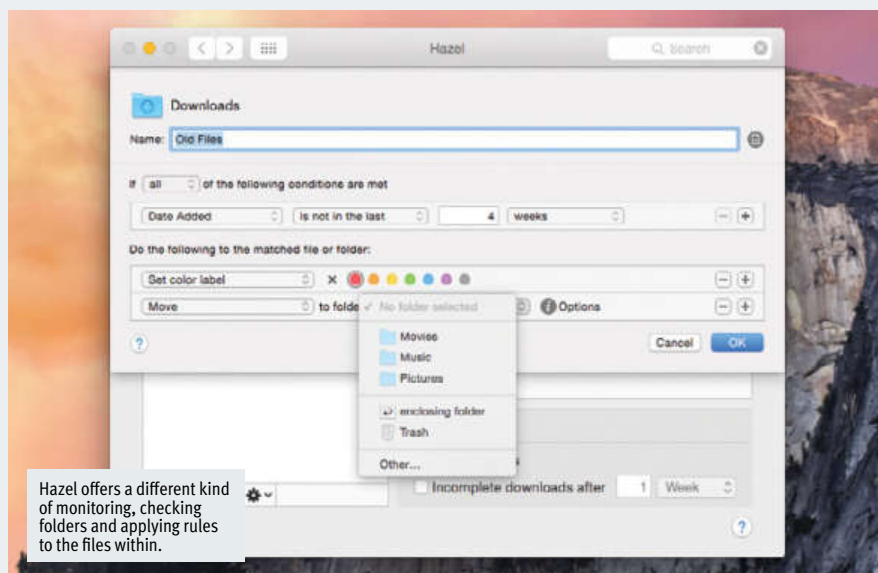
In GrandPerspective, go to File > Scan Folder and select a folder for the app to scan. This can be at any level on your Mac, but it makes more sense to scan widely rather than select something specific, such as your Downloads folder. Therefore, either scan your user folder, or select the top level of your Mac's internal drive. Click 'Scan' and GrandPerspective will get on with its search. The app has to trawl through every file and folder within the one you selected, so this process can take a while, especially on older Macs. You can still use your Mac in the meantime, and you can cancel the scan if it's slowing things down too much.



02

INSPECT THE SCAN RESULTS

When the scan is complete, your drive's contents are represented by a bunch of rectangles. This is all very abstract, but there is logic to it. The larger rectangles represent bigger files, and items within the same folders are shown within a larger containing rectangle. For example, your Downloads and Documents folders will be found within one specific area of the representation of your Mac's drive, rather than the various files within them being spread randomly about the graphic. Select an item and you'll see its size and filename in the status bar at the bottom of the window, and its parent folder will also be highlighted.



Hazel offers a different kind of monitoring, checking folders and applying rules to the files within.

like a solid red block. Under these circumstances, sort the processes by clicking the '% CPU' or Memory column headings, respectively. If an app is taking up an unreasonable amount of CPU, leave it for a bit to see if it can complete its task. If that doesn't work, select the app in the list, click the cross button (top-left), and then choose Force Quit. Note that red items are entirely unresponsive, and are often the cause of problems; you'll often see this with tabs in Safari (helpfully

listed by URL), due to misbehaving websites. If one regularly eats up large amounts of CPU or RAM, stop visiting that site. Similarly, if you find an app often taking huge chunks of memory over and above anything remotely sensible, it might have a memory leak, so check for an update or, failing that, an alternative. Network problems are typically harder to nail down. Little Snitch (€29.95 – about \$47, **obdev.at**) can help weed out errant apps, through intercepting their communications with

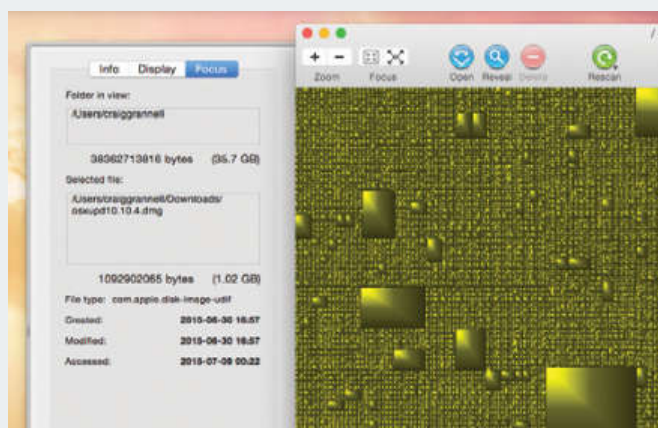
**RATHER THAN
REACTING TO PROBLEMS
AFTER THEY'VE
OCCURRED, IT'S
SMARTER TO GET SOME
ADVANCE WARNING.**

servers and analysing your bandwidth. It's quite an involved app, but its detailed display is relatively easy to get to grips with, and powerful rules provide the means to enforce certain conditions under specific circumstances.

GETTING SPACE BACK

Storage space is, fortunately, simpler to deal with. DaisyDisk (\$12.99, **daisydiskapp.com**) or GrandPerspective (free, **grandperspectiv.sourceforge.net**) help analyse your user folder or entire Mac, quickly spotting large files that you can choose to trash. Alternatively, Disk Doctor (US\$2.99, **f1plab.com**) will automatically trawl your Mac for large files for potential disposal, while Duplicate Zapper (\$1.29, Mac App Store) will restrict itself to duplicates. In all cases, take care while using such apps. When in doubt, back up first, and only trash items you definitely aren't going to need in the future.

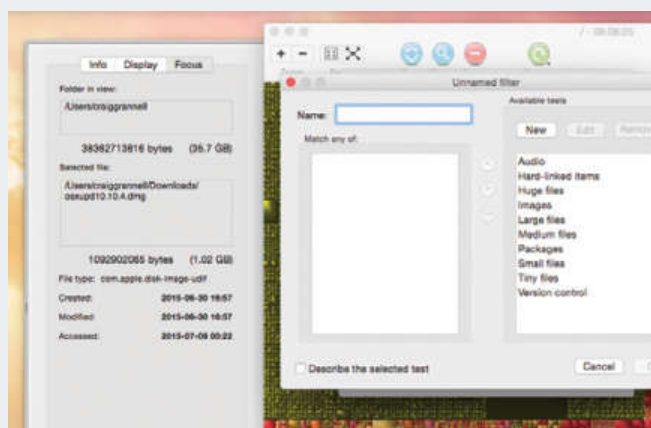
It's also worth considering monitoring specific folders. You can use rules in Hazel (US\$29 – about \$41, **noodlesoft.com**) to keep an eye on the likes of your Downloads folder, filing content by conditions like type or date, and periodically emptying the trash to free up precious space. ■



03

GET MORE INFORMATION

Narrow the window and click Drawer to access further information. Info gives you an overview of your scan, and Focus tells you more about the selected item, including dates when it was created, modified, and last accessed. Use the toolbar buttons to change your view and focus. The + and – buttons zoom in and out of the folder or folders that contain your selection, and the two Focus buttons broaden or narrow your selection. For example, you can select an item in Downloads, and as a comparison use Focus to check the size of the entire folder. (If a containing folder is small, so too will be any file within, even if it takes up most of that folder.)



04

FIND, DELETE AND FILTER FILES

You can delete items directly from GrandPerspective by selecting them and clicking Delete, but only if 'Enable deletion of' in the app's preferences is set to something other than 'Nothing'. Be very careful regarding what you remove – only delete files or folders where you know their function and that you won't need again (or have a copy stashed somewhere). Large apps (OS X and iOS) you no longer use, for example. You can alternatively Ctrl-click to reveal or open the item in Finder. Should you want to narrow subsequent searches to specific file types, explore GrandPerspective > Filters; set up rules and then use File > Filtered Scan.

[ANDROID]

Take the hassle out of Android lock screens

USE LOLLIPOP'S SMART LOCK FEATURE TO SKIP THE LOCK SCREEN WHEN IT ISN'T NEEDED.

[SIMON CHESTER]

GIVEN THE AMOUNT of sensitive data that your phone holds and can access, keeping your device locked with a PIN, password, or pattern is now a must. But, while I understand the importance of keeping my device locked, I also dislike having to squiggle my security pattern on the screen every time I want to access my phone. So for years now I've been using Tasker to disable the lock pattern when I'm at home, or while my Pebble watch is connected.

Since Lollipop, however, that functionality has been baked in to the OS — it's now called Smart Lock — making it a little more reliable, and lot easier to set up.

In fact you can now also unlock your device using an NFC card/sticker, your voice, or your face, or disable the lock screen while a chosen Bluetooth device is connected, while you're in a specific location, or while it's on your person (it uses the accelerometer to know when it's been put down).

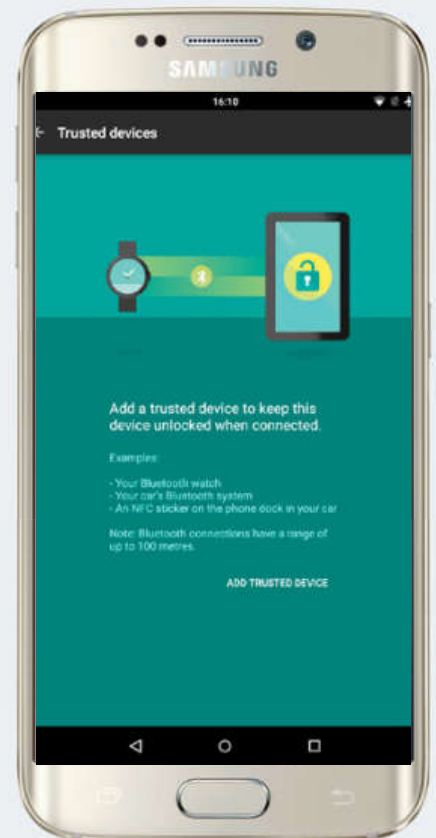
Each of these methods can be activated and set up in the 'Lock screen > Smart Lock'

section of the Android Settings menu. Before you set them up, however, let's take a look at the different 'Smart Lock' methods available, and how you can use them.

BLUETOOTH DEVICE

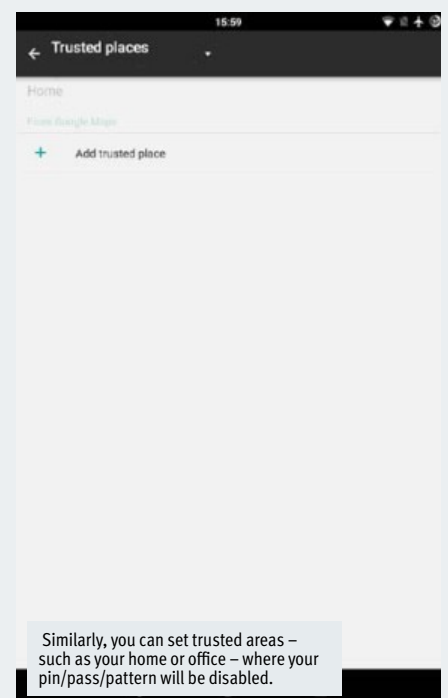
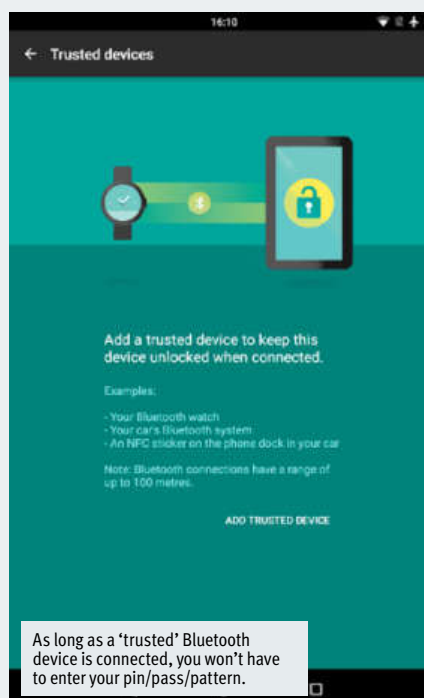
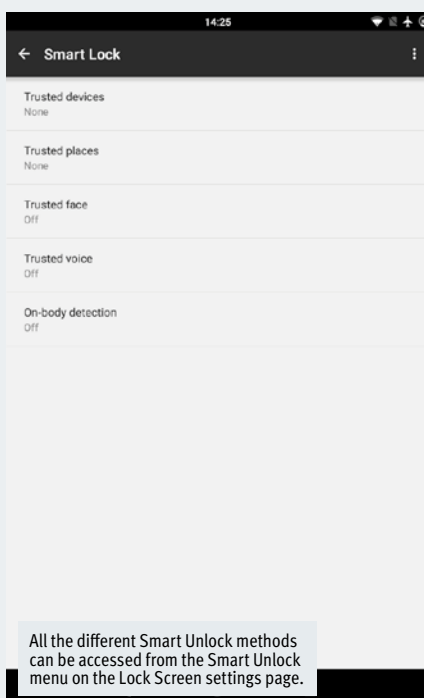
My preferred method of smart unlock is using a Bluetooth device — largely because my Pebble smart watch is just about always connected to my phone. The Bluetooth unlock method works by assigning one or more Bluetooth devices as 'trusted devices'. As long as these devices are connected to your phone,

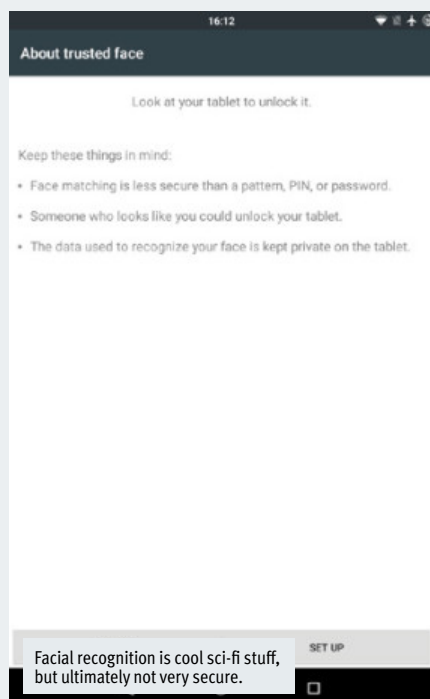
“MY PREFERRED METHOD OF SMART UNLOCK IS USING A BLUETOOTH DEVICE — LARGELY BECAUSE MY PEBBLE SMART WATCH IS JUST ABOUT ALWAYS CONNECTED TO MY PHONE.”



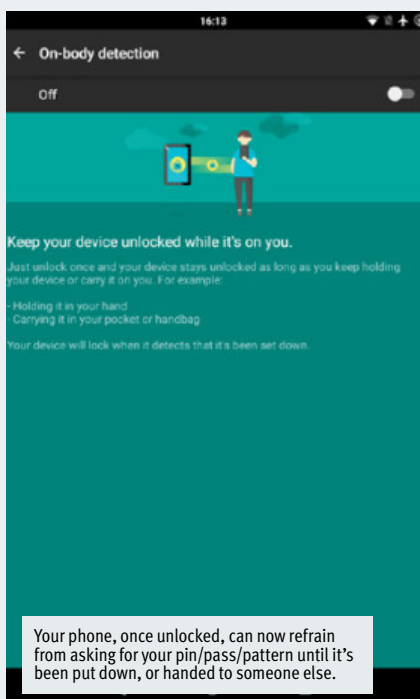
you won't have to enter your pass/pattern/pin to unlock your phone or tablet.

If you use a Bluetooth handsfree kit or headphones only sporadically, it won't be quite as convenient as if you had a smart watch, but if you combine the Bluetooth smart unlock with a location-based smart unlock for home and office, then you're covered for most of the time, anyway — presuming you use Bluetooth headphones during your commute.

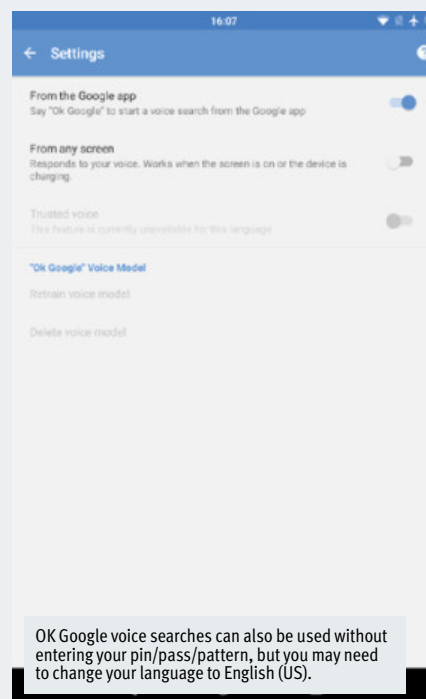




Facial recognition is cool sci-fi stuff, but ultimately not very secure.



Your phone, once unlocked, can now refrain from asking for your pin/pass/pattern until it's been put down, or handed to someone else.



OK Google voice searches can also be used without entering your pin/pass/pattern, but you may need to change your language to English (US).

LOCATION

You can have your device unlock when you're in a certain location — preferably one with a Wi-Fi network, as it'll allow Smart Lock to infer your location more reliably. If you've ever told Google Maps where your home is located, you'll find your home has already been placed in your 'Trusted Places' list. The easiest way to add a new trusted place is when you're actually there, so first locate yourself in a trusted place, then just press the 'Add trusted place' item in the 'Settings > Lock screen > Smart Lock > Trusted Place' menu. Your phone will then figure out where it is, and if it looks right, press 'Select this location.' Note that there's no real point in fine-tuning the location by dragging the map — for best results, as long as it's approximately correct, leave the pin where your phone puts it.

YOUR FACE

Using your face as a method to unlock your phone, instead of a pin/pass/pattern, has been in Android since Ice Cream Sandwich (v4.0). It's been criticised as insecure (pictures and videos of your face displayed on other smartphones have worked to unlock devices), so I stay away from it.

However, it has been slightly tweaked for Lollipop, and now works in tandem with your pin/pass/pattern, and silently in the background. Meaning that if you swipe to unlock your device, you won't be prompted for a face scan (potentially tipping off would-be hackers): if it recognises you, it'll unlock, if not,

no cue will be given and you'll be expected to enter your pin/pass/pattern as per normal.

Note though that, if you have anyone that wants to get in to your phone (from a pesky younger sibling to your arch nemesis), then it is probably the easiest method to circumvent, so I hesitate to recommend it.

YOUR GAIT

This is a curious addition to the unlock options, in that it is termed as 'unlock when your device is carried on you'. It basically analyses the pattern of your walk, and then locks your device when it senses movement that doesn't match it — including putting your phone down somewhere, or if someone else is carrying it.

Like the facial recognition, it's not ideal for maximum security, as there is a chance that it won't automatically lock when it's passed to someone else while in an unlocked state (which is not so good if your phone gets pickpocketed).

YOUR VOICE

If you're a big user of 'OK Google' voice searches, you can trigger them and access the results without having to enter your pin/pass/pattern by adding a 'Trusted voice' from the Smart Lock menu. Of course, you will have to have enabled 'OK Google' from the Google Search app, too, and you may also have to set your language to 'English (US).'

MANUALLY LOCKING YOUR DEVICE

If your nosy neighbour has come over to visit, you may not want to leave your phone unlocked while they're around. To temporarily override Smart Lock and have it require your pin/pass/pattern again, simply touch (or touch and hold if you have accessibility services enabled) the lock icon on your lock screen.

NFC TAG

You can set your device to unlock when it reads an NFC tag or sticker (which are less than a few dollars on eBay). This is best used with an NFC sticker placed in the back of the phone holder in your car or other dock, as when the device is no longer in contact with the NFC tag, it will lock again.

SETTING UP SMART LOCK

Setting up your Smart Unlock method is now just a matter of visiting the 'Lock screen' section of Android Settings, then scrolling down to 'Smart Lock', selecting your chosen method(s), and following the on-screen prompts.

Note that, if you haven't already, you should first enable a pin/pass/pattern from the 'Screen lock' section of the 'Lock screen' menu — otherwise this is all rather moot, isn't it? ■

[VIDEO TO GO]

Seven essential streaming apps

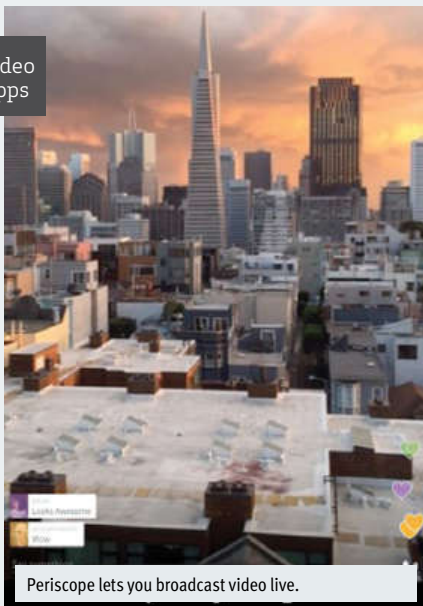
CHECK OUT THESE STREAMING APPS FOR YOUR MOBILE THAT YOU MAY NOT HAVE HEARD OF.

[NATHAN TAYLOR]

WHEN IT COMES to streaming, mobile users are now really spoiled for choice. There are dozens of music and video streaming services available, and you're probably already aware of many of them: YouTube, Spotify, Pandora, Netflix, Stan, Presto, QuickFlix, TenPlay, iView and SBS On Demand are some of the best services with mobile apps.

This month we're going to take a look at some of the great but lesser-known services, all of which are worth downloading.

Video apps



Periscope lets you broadcast video live.

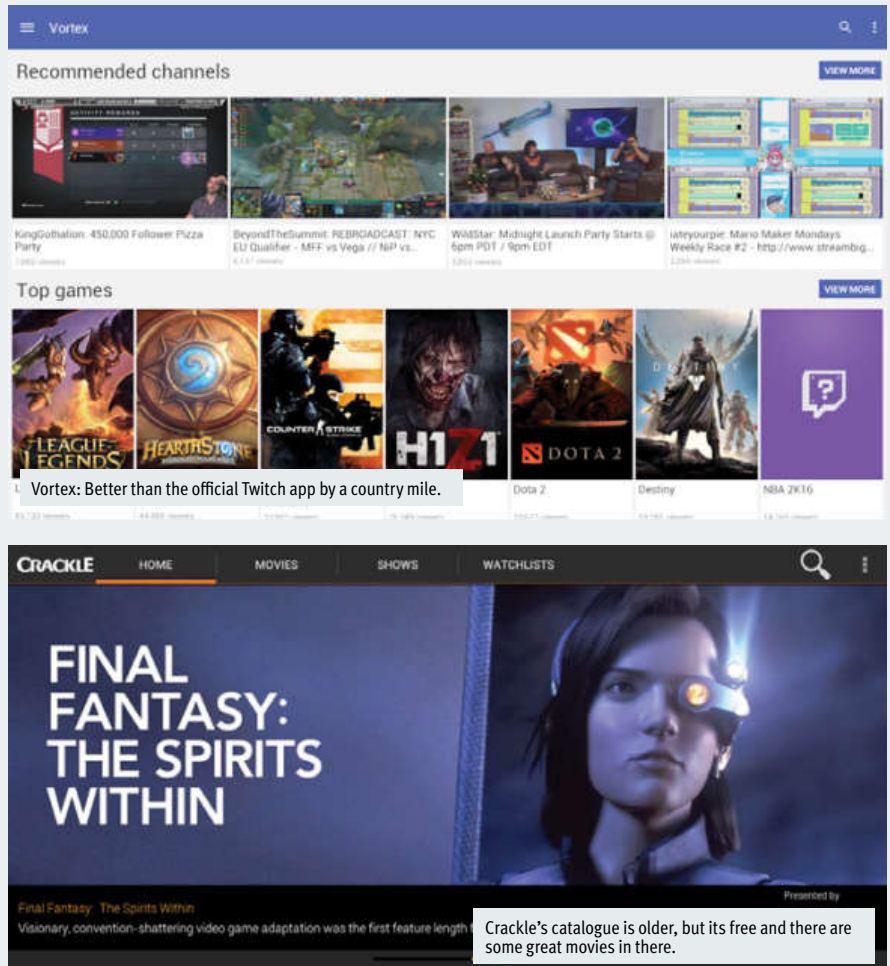
[SELF-BROADCASTING]

Periscope

www.periscope.tv
Android, iOS

PERISCOPE IS AN app made by Twitter that can turn you into a broadcaster – or narrow caster. It uses your Twitter account and lets you beam whatever your phone camera is recording live across the internet. You can use it to beam big public events to every Twitter follower, or private events to family members and friends who couldn't be there in person. If you want the latter, you mark a recording as private so only certain people have access to it. Recordings are also stored on Twitter's servers, so they can be rewatched for the next 24 hours.

If you're not interested in plugging into the Twitterverse, there are some good alternatives to Periscope. Meerkat is probably the best of the rest, but Livestream is also very good and lets you access more than just community streams. You could also try UStream and YouNow for personal streaming.



[VIDEOGAME STREAMING]

Vortex

play.google.com
Android

VORTEX IS THE Android Twitch player we need, as opposed to the slow and bloated official Twitch player. It's a light and very quick player, and it lets you access all current Twitch streams. We've found it launches faster, consumes less resources and is rather more stable than the actual Twitch app. It also filters out ads – which we admit that is a mixed blessing: sometimes you'd like to actually support the streamers you're watching.

The one big thing that the official Android Twitch app has that Vortex doesn't is video on demand access to past broadcasts. Hopefully that can be added in the future (as well as the ability to turn ads on for specific casters), and then we'll never have to deal with the Twitch app again.

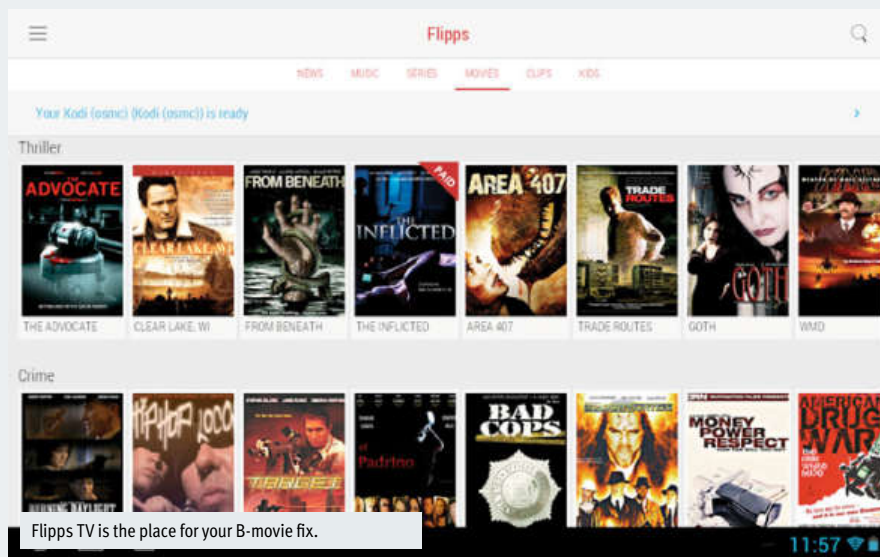
[TV AND MOVIE STREAMING]

Crackle

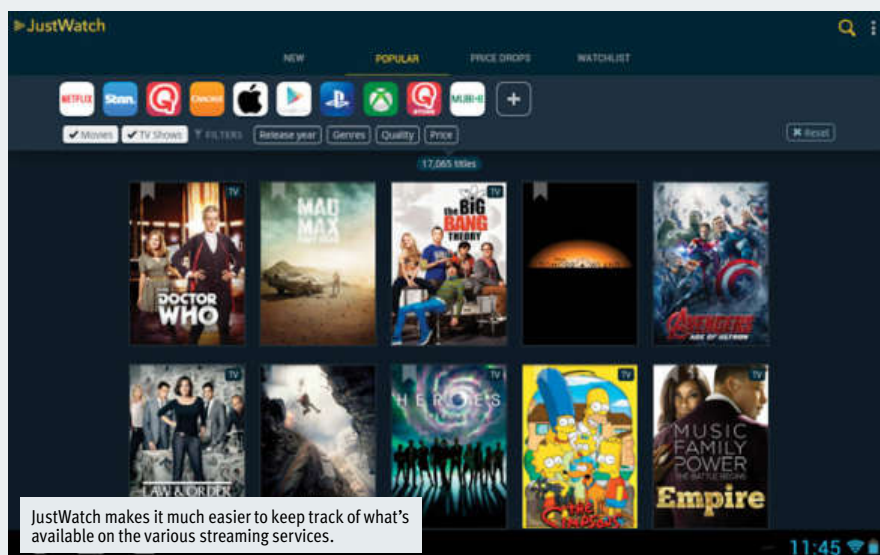
www.crackle.com
Android, iOS

CRACKLE, WHICH WE'VE also highlighted in this month's Unearthed feature (see page 30), can best be described as a free version of Netflix. Like Netflix and its ilk, it hosts a variety of movies and TV shows that can be streamed directly – not just to your PC, but to your mobile too. Getting around geoblocks on mobile is a bit trickier, so the selection isn't as good as you'll get on desktop with Hotspot Shield – titles tend to be somewhat older – but you can always find a few gems and classic movies in there if you're willing to look.

Movies are streamed in SD – which is generally fine on a mobile or tablet, and can save serious amounts of data if you're on a 3G network. (Like Netflix, Stan, Presto and other streaming services, there's an option to only stream over Wi-Fi, which is highly recommended).



Flippis TV is the place for your B-movie fix.



JustWatch makes it much easier to keep track of what's available on the various streaming services.

[TV AND MOVIE STREAMING]

Flippis TV

www.flippis.com
Android, iOS

IF YOU FIND you're a fan of Crackle, you should also definitely check out Flippis TV, a similar service that offers even more older and niche content. The collection of TV shows and movies is amazingly varied and esoteric, from 90s fitness videos to episodes of Popeye the Sailor Man and Bugs Bunny. There's also a solid collection of Anime and if you're a lover of B-movies this is really the place to visit. (As an aside, if you're into Anime, you should definitely also get hold of another app called Crunchyroll). There's also a selection of news and music content drawn from various web sources, including the BBC, Vimeo, NY Times and others.

Flippis also has a neat Play To functionality, which beams any video you're watching to a DLNA player, Chromecast or Apple TV device.

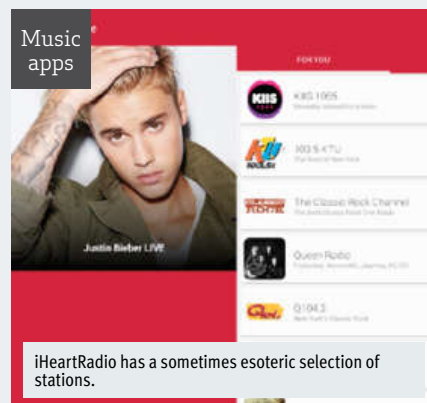
[STREAMING VIDEO DIRECTORY]

JustWatch

www.justwatch.com/au
Android, iOS

IF YOU'RE A subscriber to one or more streaming services, knowing what's on and what's worth watching can be a pain. The array of choices can be paralyzing. That's where JustWatch comes in. It shows you new and current popular videos across multiple streaming and download services to make it easier to find things that you might be interested in.

It has a localised version for Australia and New Zealand, and during the setup process you select which services you're a subscriber to. It includes Netflix, Stan, Quickflix and Crackle and also includes online stores like Google Play, the Microsoft Xbox Store, Apple Store and Playstation Store (it will also let you know about price drops on the stores).



[ANDROID & IOS]

IHEARTRADIO

www.heart.com

An aggregator of a large number of online radio stations, iHeartRadio is perfect for people who prefer good old fashioned curated radio to the playlists of Spotify. It includes both music and talk radio, and you will get the actual unfiltered streams from the radio stations you select. Thousands of radio stations from around the world (including a number of Australian stations) are selectable.

You start by choosing the genres you like, at which point the app will recommend a number of stations. You can also search for specific radio stations. As with other music apps like Spotify, the station can play in the background while you do other things.

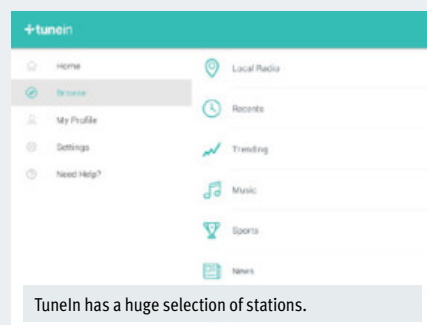
[ANDROID & IOS]

TUNEIN

www.tunein.com

Like iHeartRadio, TuneIn is an internet radio station aggregator, letting you plug into the streams of thousands of online stations. It doesn't have the genre-based recommendations of iHeartRadio, but it does have a truly huge selection of radio stations (much more so than iHeartRadio), including most of the major local stations. If you want to listen to a local station, you just tap Local Radio and it will use your IP address to determine your location and offer up a list of relevant stations. It also includes audio books and podcasts in its selection.

As with other radio apps, you can leave it running in the background, so you can do other stuff while you listen.



TuneIn has a huge selection of stations.

[SECURITY AND PRIVACY]

Avoid unwanted software

THESE INSTALLATION TIPS AND TRICKS WILL HELP YOU BETTER CONTROL PRIVACY AND SECURITY ON YOUR PC OR SMARTPHONE.

[NATHAN TAYLOR]

WE'VE ALL BEEN there. We installed a new app and just clicked through the license agreement without reading it, then proceeded to just repeatedly click the next button until the whole ugly process was over. We know it's bad, but life is short.

Of course, that's so often where they get you, making you agree to a horrible license, installing unwanted apps on your system, and doing things like changing your home page. So this month we thought we'd take a look at the install process – you rights and responsibilities, and a few of our favourite methods for avoiding unwanted software.

THE EULA AND THE LAW

Your typical End User License Agreement is a legal monstrosity designed to absolve the software creator of all responsibility and strip you of all recourse. It's also written in dense legalese, ensuring that almost nobody ever reads it before accepting.

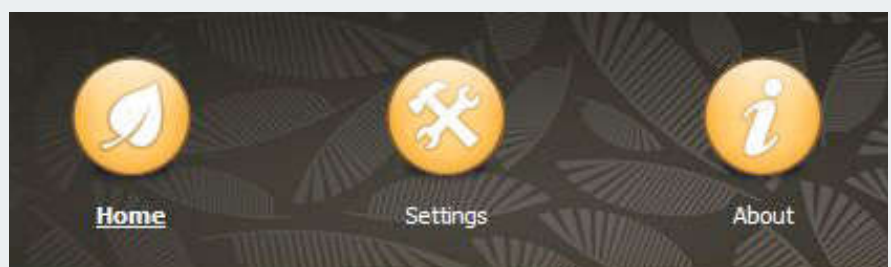
We're not going to be unrealistic and recommend that you read EULAs before accepting them, but you should know your rights in this area. No matter what the EULA says, it doesn't override Australian Consumer Law. And that law says (among other things) that:

- * the product must be of acceptable quality,
- * it must be fit for a particular purpose,
- * it must match the description provided,
- * the seller can't say "no refunds" (though they can say "no refunds in case of change of mind"),
- * the seller can't completely abrogate responsibility for consequential losses (eg. if the software damages your system in some way).

We don't have space here to cover all of it, but it's absolutely worth heading to www.consumerlaw.gov.au and reading up on your rights as a consumer (especially as it applies to everything, not just software). You'll likely find that you have a lot more rights than you thought.

UNCHECKY

One of our favourite Windows apps, especially when we're coming from a clean install and going through the process of reinstalling all



Welcome to Unchecky, the program that aims to keep potentially unwanted programs out of your computer.




The Unchecky service is up and running.

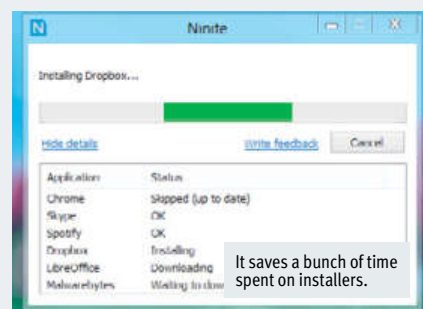
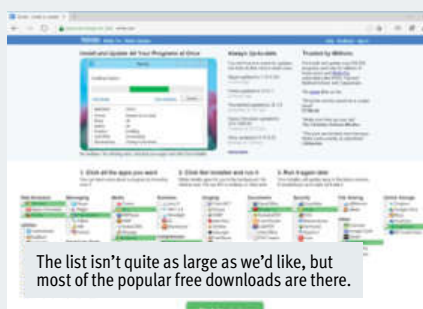


Looks like Unchecky was just recently installed. There's no data to show yet.

Unchecky automatically rejects unwanted offers that come with many (especially free) apps.

 Suspend service

WE'RE NOT GOING TO BE
UNREALISTIC AND
RECOMMEND THAT YOU READ
EULAS BEFORE ACCEPTING
THEM, BUT YOU SHOULD
KNOW YOUR RIGHTS IN THIS
AREA.



our stuff, is Unchecky (unchecky.com). It's a small app that will automatically uncheck any optional boxes during the install process of a large database of apps.

How many times, for example, have you had something like McAfee or the Ask Toolbar installed unwillingly because instead of paying attention during the install process of an app you just did the Next->Next->Next click through install on an app you did want?

Unchecky lets you still do that fast install click through, but will automatically uncheck any boxes for unrelated "offers" and will warn you and uncheck any boxes for installing third party apps.

Unchecky runs as a service in Windows, automatically kicking in whenever you try and install an app in its database. When you come across a situation where an app you're installing might install a third-party app, it will pop up a warning. All checkboxes will default to "decline" for third party apps, browser toolbars and the like and any "offer" to change your browser home page will be rejected. It only take up about 2MB of memory when it running, but you can uninstall it if you like once you're done installing all your apps.

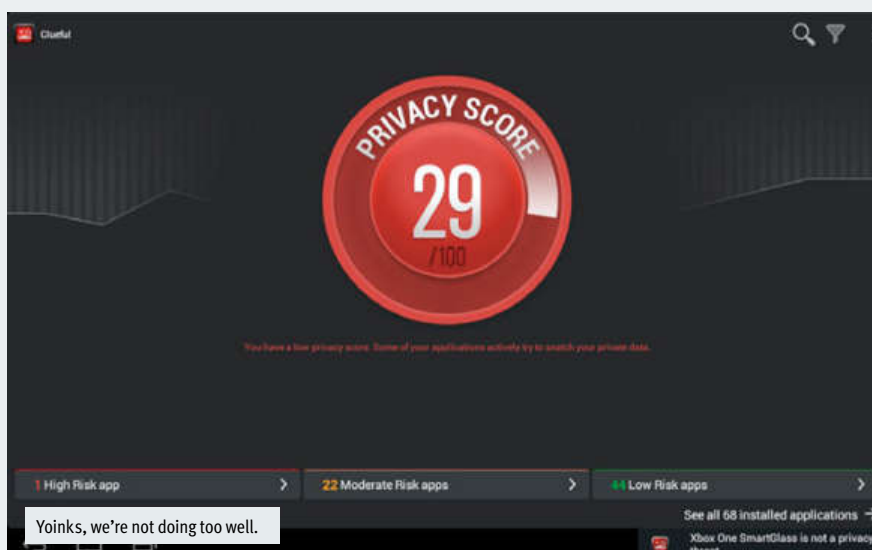
NINITE

Another tool we love for fresh system installs is Ninite (ninite.com). Ninite lets you pick from a checklist of popular free apps, and it will automatically go and install them for you.

The process is pretty simple. You head to ninite.com and check the boxes on all the apps you'd like to install, then click on the Get Installer button.

This will download a custom app for you. Run this app, and then Ninite will automatically download and install the selected apps in the background, with no need for you to interact with the installers at all.

Apart from the convenience of it, Ninite has quite a few security and privacy advantages. Like Unchecky, it automatically rejects "offers" and third party downloads. It only downloads apps from the official site, and it performs a hash check on the app to make sure you're getting the real thing. It also automatically



downloads 64-bit versions of app on 64-bit systems.

If you run the app again later, Ninite will also perform an update check on the installed apps. If there's a new one available, it will download and install that.

ANDROID APP PERMISSIONS

Much like license agreements, most people tend to just click through app permissions on Android. It's too hard to figure what permissions are reasonable and what are excessive, or what might constitute a danger to your privacy. If you're worried that apps might be jacking your phone or monitoring your location or activity, it's worth installing a permission monitor on your phone.

The best ones tend to require root access to your phone and App Ops, which was an excellent hidden tool in older versions of Android, has been removed. But there are a few good ones that are still worth exploring.

Our current favourite is Clueful Privacy Advisor, from BitDefender. It looks not just at the your app permissions, but also checks a database of known applications for potentially damaging features.

It provides both an overall rating for your Android system as well as granular details on

individual apps and what they might do to harm your privacy. You can use it to get a quick overview of how your installed apps do on the privacy front, and you can actually uninstall the worst threats from within Clueful.

ANDROID 6.0 (MARSHMALLOW)

One of the changes in the new version of Android is an access time permission request. No longer do you just provide a blanket agreement to permissions at install time; instead when an app tries to access a system function you'll be asked if you want to give it permission.

For example, if an app tries to access your phone, the first time it does so you'll get a popup asking if you'd like to allow it. Once you do, that app will have that permission forever. You can also view and modify app permissions from the settings menu, which brings it more in line with how iOS treats such permissions.

[IP FREELY]

All about that NAT

UNDERSTANDING NETWORK ADDRESS TRANSLATION SHOULD MAKE CONFIGURING YOUR ROUTER MUCH EASIER.

[NATHAN TAYLOR]

QUITE A FEW years back now, internet engineers realised we had a problem. And that problem is that IP version 4 (IPv4) addresses are only 32 bits long (they're typically represented by a quartet of eight-bit numbers, eg. 192.168.1.1). That meant that there were only about four billion possible internet addresses – which is not enough, given that pretty much everything is now connected to the internet.

In the long term, the solution to this problem is IP version 6 (IPv6), which extends address length to 128 bits (for a total of 340,282,366,920,938,463,463,374,607,431,768,211,456 addresses, which should keep us going for a while). But it turns out that getting the entire internet to switch to a new standard is really, really hard. So in the meantime we have network address translation (NAT).

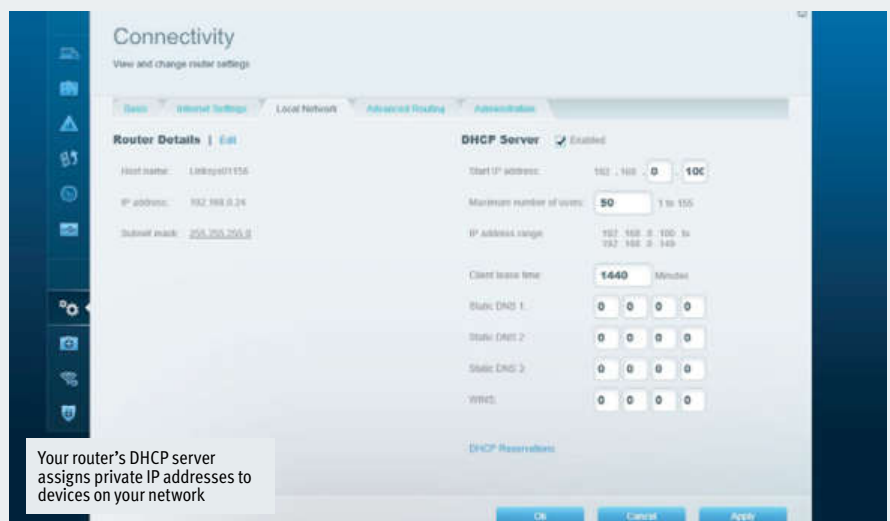
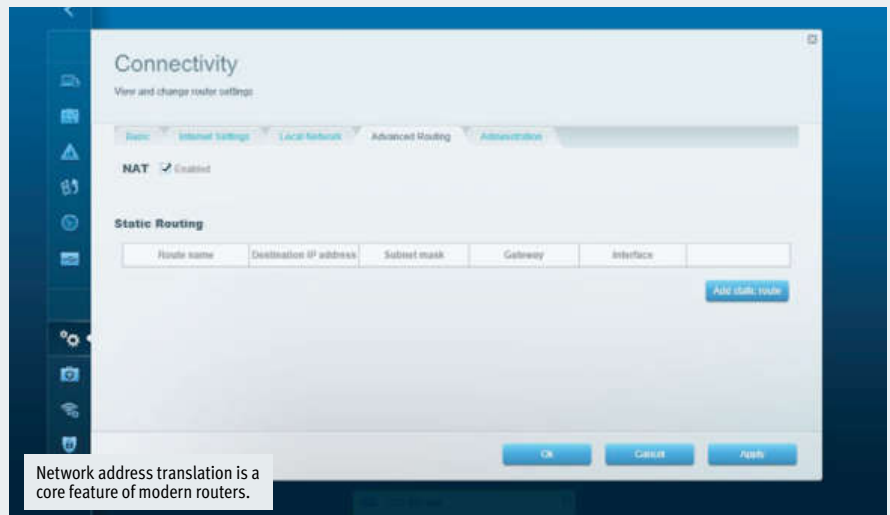
NAT lets you connect multiple devices to a single IP address. When you connect to the internet, your ISP will give you a single IP address. This is known as your public IP address, and it's the only one visible to the rest of the world. NAT allows you to share this IP address across multiple devices.

On your LAN, instead of using a public IP address, each device is instead assigned a private IP address by your router to serve as their unique identifier. Several IP ranges – notably 192.168.X.X and 10.1.X.X – have been set aside for just this purpose.

You devices can communicate with each other using these IP addresses, but nothing outside your network can see them (that's why your neighbour can also have devices configured to 192.168.X.X without conflicting with yours). But to communicate with the outside world, they have to go through your router, which uses its NAT service to act a proxy for them.

ROUTING AND THE FIREWALL EFFECT

One of the side effects of using NAT is that it actually provides a level of security for your devices through an effective firewall. Let's say you're using a PC with the private IP address of 192.168.1.2. To request a web site, the PC asks your router (which has a "real" public IP address) to grab the site for you. Throughout the course of the communication between the



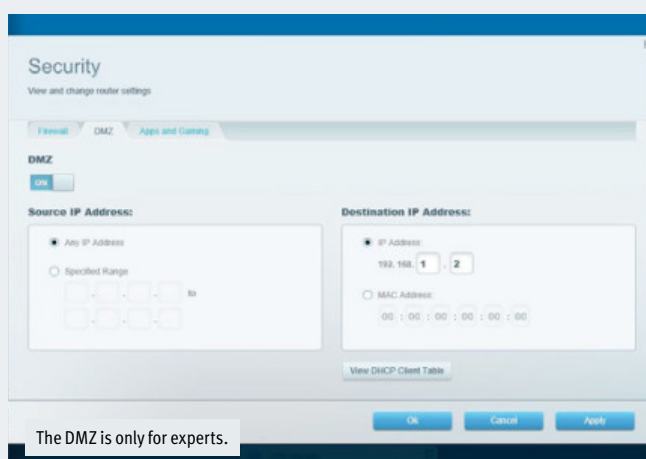
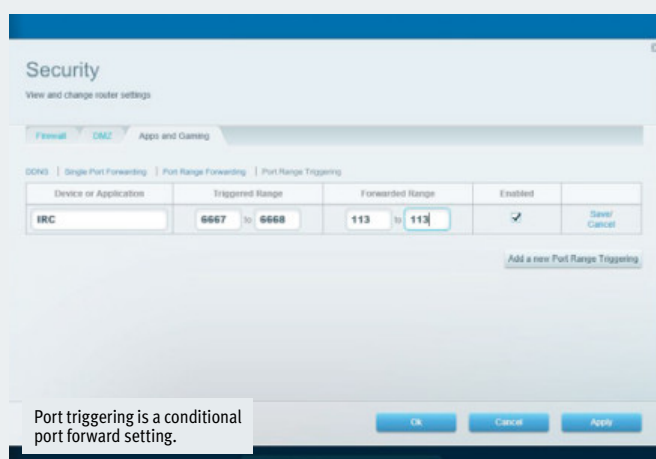
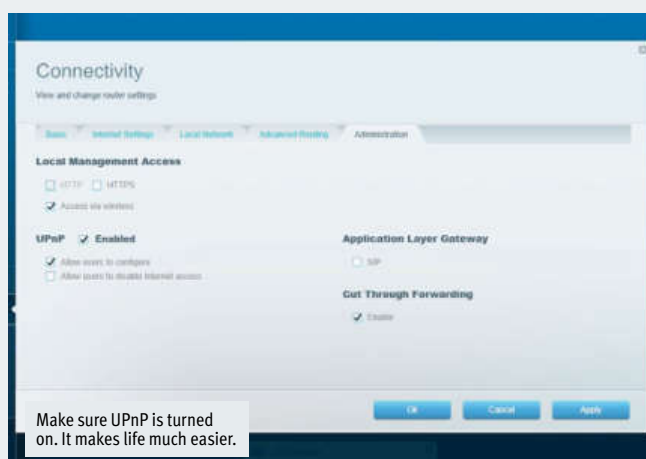
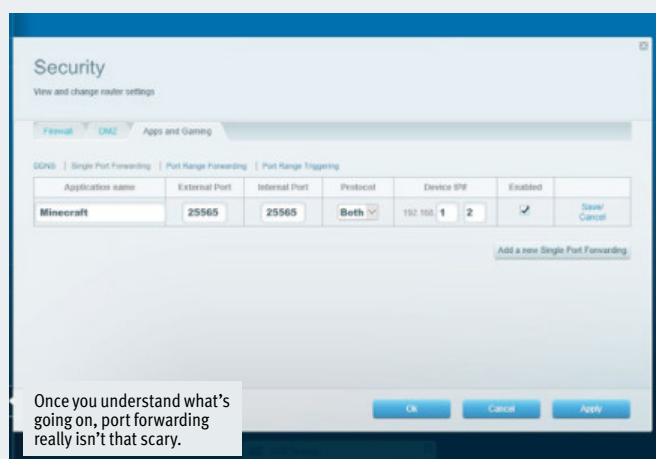
PC and site, the router then constantly acts as a translator. When the site responds, it remembers which private IP address requested the site and forwards the data on to that PC. As long as the connection between the PC and site is open, the router knows which private device to forward the data on to.

But what happens when a site or user on the internet tries to contact a PC on your LAN, without your PC first initiating the contact? The NAT-enabled router will be getting a connection request on the public IP address, but it won't know which device (ie. which private IP address) to forward that request on to. So it just rejects the request.

In effect, if you're using NAT, connections can only be made one way. You can dial out, but people can't dial in. In many cases that's a good thing – it stops hackers and malware from accessing your systems, just like a firewall. But sometimes you'd like people to be able to talk to your devices. Maybe you're running a server (like a media or Minecraft server), or use a direct chat client. This is where port forwarding and UPnP come in.

PORT FORWARDING

We've talked a little bit about port forwarding before in this column, but if you've followed what we've written above, you'll probably



understand a little better how it works. Port forwarding tells a router that whenever traffic comes in on a particular TCP or UDP port, it should always be forwarded onto a specific private IP address. For example, if you run a Minecraft server on a PC with the private IP address 192.168.1.2, you could tell your router that all incoming traffic on port 25565 (the port that Minecraft uses) should be forwarded on to 192.168.1.2. That way people from outside your network can make a connection and the router will know where it goes.

Every app and service uses its own unique port, and you'll have to do a bit of research to find which one you need to forward. But once you've done that, setting up port forwarding is actually pretty easy. You just:

- 01 Head to the router admin console, and find the port forwarding settings. Usually they're found under the firewall or security settings areas.
- 02 Click on add a port forwarding rule.
- 03 Give it a name, and enter the port number you want to forward (generally the external and internal port numbers are going to be the same, unless you plan on running your internal server on a non-standard port).
- 04 Generally, you'll choose to forward both UDP and TCP packet types (these are the two major types of IP traffic).

05 Enter the private IP address of the target computer, the one on which you're running the server.

06 Save the rule. Now any incoming data on that port will automatically be forwarded onto the selected device.

You can make as many such port forwarding rules as you like. You can also choose to forward ranges of ports (say 2500 to 2600) rather than a single port.

UPNP

The good news is you don't have to set up port forwarding nearly as much as you used to. UPnP on routers lets applications configure their own port forwarding. The application can talk to the router and ask that a particular port be forwarded to it for as long as it's running. That way, you don't have to face any scary port forwarding settings at all.

If you're having communications problems, the first thing you should do is check if UPnP is turned on in your router settings. If it is, and it still doesn't work, only then should you resort to port forwarding.

PORT TRIGGERING

Port triggering is another option on most routers, but it's one that most people probably won't find much use for. It's a special kind of conditional port forwarding. With port triggering, when the router senses a

connection on a specific outgoing port, it will then automatically activate a port forwarding rule for incoming traffic.

For example, you could set up a rule that says "if I make an outbound connection on port 6667, then forward all incoming traffic on ports 113 and 6000-700 to this PC." These days, port triggering is fairly niche, and not something most users have to worry about.

THE DMZ

The DMZ (demilitarized zone) is a special case of port forwarding. The router forwards all data on all ports onto a PC configured in the DMZ. In essence, that computer is 'naked' to the internet, and has completely free and open access to all ports (and anyone can communicate with it openly).

In many cases, the DMZ setting on a router is a single IP address that you enter. You could configure 192.168.1.2 as being in the DMZ and the router would then forward all data on. In some more sophisticated settings you can use a device's unique MAC address in lieu of the private IP address and specify IP ranges that can contact the device.

Setting up a PC in the DMZ is something you should do only if you really know what you're doing and are 100% sure of the security of that device. It makes the device as accessible to anyone on the internet as if they were on your home network. ■

[PHOTOGRAPHY MASTERCLASS]

Core photography skills: using Live View

YOUR CAMERA'S LIVE VIEW DISPLAY ENABLES YOU TO SHOOT SHARPER STILLS AND DETAILED HD MOVIES – AND MORE BESIDES.

[MARCUS HAWKINS]

WHAT IS LIVE View, and how do I activate it on my camera?

When a camera is in Live View mode, it streams the live image being recorded by the imaging sensor onto its rear screen. The majority of CSCs (compact system cameras) and point-and-shoots use Live View mode by default, but SLRs need to be toggled between viewfinder shooting and Live View mode.

The way in which you do this differs between camera models: some SLRs require you to flick a short lever on top of the camera, while others require you to press a button on the back.

WHY CAN'T I SEE ANYTHING THROUGH THE VIEWFINDER DURING LIVE VIEW?

Normally a mirror and a set of shutter curtains block the imaging sensor. The mirror bounces the image up into the viewfinder so that you can see the image; then, when you take a picture, the mirror flips up out of the way and the shutter curtains open to expose the sensor to light. Because Live View requires a constant feed from the camera sensor, the mirror needs to be kept up out of the way, so the viewfinder turns dark.



SO LIVE VIEW ESSENTIALLY TURNS AN SLR INTO A POINT-AND-SHOOT CAMERA?

Yes – in the sense that you can see what you're shooting on the screen rather than through the viewfinder. But it doesn't dumb down the camera at all. You're free to choose the settings and make adjustments as if the camera was

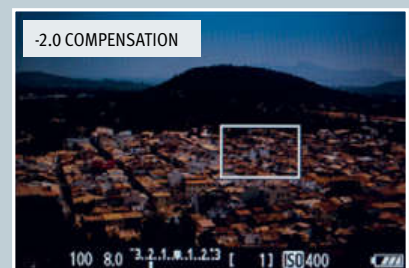
still being held to your eye, including switching everything to Manual mode.

WHY AND WHEN WOULD I CHOOSE TO USE LIVE VIEW?

You can use Live View whenever you like, but the backlit screen makes it particularly useful

TECHNIQUE BETTER EXPOSURE

See the effect your exposure settings will have before you shoot



The Live View display can be set to exposure simulation mode on many cameras. This provides a decent indication of the exposure of a picture before you take it, so by dialling in exposure compensation, the image on the monitor will get progressively brighter or darker. This can make it harder to focus, though, so either do this before adjusting the exposure or deactivate the feature.



KEY FEATURES OF LIVE VIEW

Here are the controls you'll use to see a scene through your camera's rear display

01 LIVE VIEW SWITCH

Your camera will be in viewfinder shooting mode by default. You'll need to trigger Live View mode using a rotating switch (to choose between stills and movies) and button combination, or by using a lever.

02 VIEWFINDER

The viewfinder blacks out in Live View because the mirror is locked out of position. This is necessary because the sensor has to be constantly exposed to light to produce the Live View image on the rear screen.

03 MAGNIFICATION BUTTON

Use the magnifying glass button to zoom in and check that details are sharp. Repeatedly tap the button to jump to different views. Big magnifications can look soft, so you may find it easier to focus using low settings.

04 OVERLAYS

You can cycle through various information overlays in Live View, ranging from a simple aperture, shutter speed and ISO readout to a multi-layered screen peppered with shooting information, a histogram or an electronic level. You can also access a range of grid displays and a crop mode that enables you to compose shots for a variety of aspect ratios.

05 AUTOFOCUS

You can use autofocus during Live view, but it's generally sluggish. SLRs usually offer a choice of 'live' mode, which bases the focus on the Live View image, or 'quick' mode, which relies on the camera's faster-focusing AF module. The latter means the mirror has to flip back down first, interrupting the Live View feed.

when shooting in low-light conditions, where you'd struggle to see much in the viewfinder. It's also great for situations where you need to use manual focusing, such as shooting macro shots and landscapes. The larger, brighter view and the fact that you can magnify details in the image while you're using Live View makes it a breeze to focus accurately.

Using Live View mode is the only way you'll be able to shoot movies, too, although the majority of cameras can't apply autofocus while you're doing so.

AUTOFOCUS DOES SEEM SLOW DURING LIVE VIEW – WHY IS THIS?

When you take pictures using the viewfinder, you can use your camera's fast phase-detection autofocus system. However, when the mirror

moves out of the way of the sensor during Live View, it prevents light from reaching this system. As a result, the camera has to gauge the focus directly from the image on the sensor.

This is known as contrast-detection autofocus: the camera measures the contrast in the image to determine what will be in focus, based on the idea that the higher the contrast, the sharper the details. It's a slower system than phase-detection, because the camera has to focus the lens backwards and forwards through the image until it detects the maximum amount of contrast.

Alternatively, you can choose to use the normal viewfinder AF system to take a picture during Live View, but it's rather clunky as the mirror has to flip back down first, causing the

EXPLAINED: CAMERA SETTINGS

You need to activate Live View if you want to shoot video on your SLR. Here's what you need to do.



CHOOSE THE RESOLUTION

First, decide what movie recording size you'll use. Bigger resolutions are generally better, although lower-resolution movies are more internet-friendly. In terms of frame rate, 25 frames per second is normal. Higher settings let you create slow-motion clips later on.



OPTIMISE THE SETTINGS

Think of movies as moving JPEG images: the settings you choose for parameters such as white balance are hard to undo later, so it's important to get them right at the time of shooting. A neutral, low-contrast picture setting is best.



CONTROL THE EXPOSURE

Your camera's auto-exposure features will continue to operate while you record, and the picture will change in brightness if you move around much. Setting the exposure manually for consistency is often better, although using faster shutter speeds can lead to jerky motion.

CAMERA SETTINGS: USING LIVE VIEW TO PREVIEW EFFECTS

See a simulated version of the finished image on the rear screen, allowing you to fine-tune settings before you take the picture



ADJUST SETTINGS

As well as previewing exposure and depth of field, you can see the effect that the processing options you've set in the camera, such as white balance, sharpness, colour saturation and contrast, have on the shot you're about to take. You can change settings while you're in Live View mode by simply pressing the relevant button on the camera and making the adjustment using the screen.



CHECK THE RESULTS

If you're struggling to 'see in black and white', selecting the camera's Monochrome picture setting will be a real boon, as you can check an image works without colour before pressing the shutter release. Increasing the sharpness can make it easier to judge manual focusing. Just remember to reduce this setting before you take the picture, otherwise your pictures may appear oversharpened.



CHOOSE RAW

We're always extolling the benefits of shooting in your camera's raw picture format, and here's another plus: by choosing raw, the settings can be adjusted later. This means that you'll save a colour image even if you've set the Monochrome picture setting. You get the best of both worlds: a colour version you can convert to black and white later, and a mono preview for judging composition.

Live View image to black out temporarily. Camera manufacturers are also beginning to add phase-detection AF functionality to SLR sensors like the Canon EOS 70D's Dual Pixel AF system, offering faster continuous autofocus during Live View.

WHY DOES THE LIVE VIEW IMAGE SOMETIMES LOOK GRAINY?

By amplifying what little light there is, the Live View display helps you to accurately frame and focus in situations where you couldn't ordinarily see anything through the viewfinder, such as at night or when a strong neutral-density filter is attached to the front of the lens. This is why the image can look blotchy – Live View is essentially amplifying the weak incoming signal to create a usable preview image. Don't worry: your pictures won't look like this.

If the Live View image appears dark, this is likely to be because the image is being displayed in exposure simulation mode. You can use this to gauge whether you need to make the image brighter or darker.

WHY DOES LIVE VIEW KEEP SWITCHING ITSELF OFF?

One of the problems of using Live View is that the sensor can get hot. This can increase the amount of noise (ugly digital grain) in pictures. To combat this, the camera will intelligently switch Live View off to prevent itself from overheating.

Live View is also a drain on the camera battery, and you'll get far fewer shots from

a single charge than you do when using the viewfinder.

ARE THERE ANY OTHER DRAWBACKS?

Camera shake can be a problem when shooting in Live View. When you use the viewfinder, you can support the camera tightly against your face, but to see the image on the

back of the camera in Live View mode, you need to hold it further away, which reduces stability.

Combine this with Live View's slower autofocus speeds, and there's a risk that you'll end up with fewer sharp shots than you're used to. That's why it pays to fix the camera on a tripod during Live View.

TECHNIQUE BETTER FOCUS

If you find manual focus a bit fiddly, Live View's here to help...

Because Live View displays the image from the sensor, it can potentially allow for more accurate autofocus. With viewfinder autofocus, a separate AF module sets the focus, and it only takes a slight misalignment for the focus to be off. However, many situations where you'll want to use Live View, such as shooting landscapes or close-ups, or recording video, work better with manual focusing.

The good news is that focusing manually is dead easy in Live View. Tapping the magnification button allows you to zoom in on details, enabling you to position the focus precisely.



ABOVE: If you find manual focus a bit hit and miss, have a go using Live View. If you want to get the subject's eyes sharp, for example, just use Live View to zoom in on that area of the picture and get the focus just so. ■



[SMART HOME MASTERCLASS]

Toilet-proof tech

THE BATHROOM IS USUALLY A NO-GO FOR YOUR TECH, UNTIL NOW.

[JENNETH ORANTIA]

THERE AREN'T TOO many gadgets that are expressly made for bathroom use. There's the odd smart toothbrush that wirelessly connects to your smartphone over Bluetooth, as well as 'shower speakers' that either replace the existing shower head or hang around it to give your lavations a soundtrack, but both are quite niche technologies that probably don't warrant their premium pricetags.

A better way to use technology in the bathroom is by either using devices that are specially waterproofed (like those pictured on page 100), or equip your existing gadgets with a waterproof casing. There are obvious merits to the latter route, the main one being that buying a waterproof case for a gadget you already own is far cheaper than buying an entirely new waterproof gadget.

KEEP IT DRY

Lifeproof has a range of excellent waterproof cases for a variety of devices, including all of the iPhones and iPads from the last three years, and the Samsung Galaxy S4 and up. Using a water-tight seal, the 'nuud' model manages to add an IP68 rating to the fragile iPad Air 2 while keeping the touchscreen completely exposed and only adding an extra 270g to the overall package. In other words, the iPad Air 2 + the Lifeproof nuud case 437g isn't that much heavier than the iPad 3.

It's worth noting that this is the same waterproof rating as the Sony Xperia Z4, but while Sony recommends a maximum depth of 1.5 metres for half an hour, Lifeproof says its nuud case makes the iPad Air 2 waterproof to two metres for an hour.

If the device you want to waterproof doesn't

come from Apple or Samsung, there are other options. Aquapac makes a range of generic pouches in different sizes to cater for phones, medium sized electronics (think iPad minis and Kindles) and larger electronics.

The advantage of using an Aquapac is that it offers a superior IPX8 rating compared to the custom-fitting waterproof cases, enabling it to handle a greater depth of up to five metres for half an hour. The downside is that controls aren't as easily accessed. The clear plastic front means you'll be able to see the screen clearly, but the touchscreen's sensitivity takes a nose dive and you can forget about using the rear-mounted camera.

One of the more 'out there' solutions for waterproofing your personal devices is using a consumer-friendly hydrophobic coating spray like NeverWet. This operates as a water



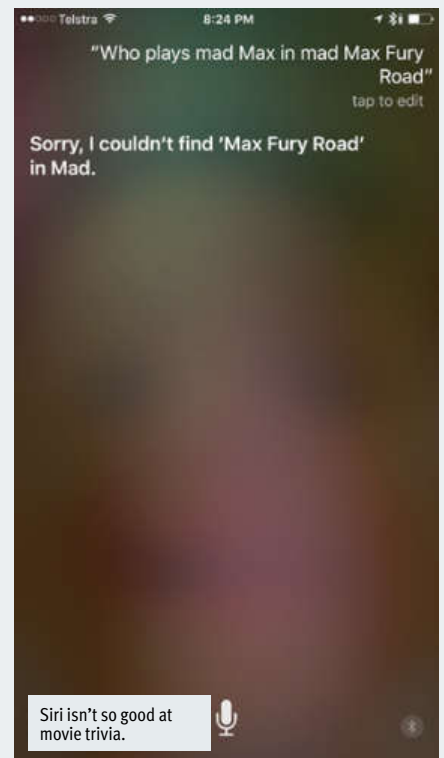
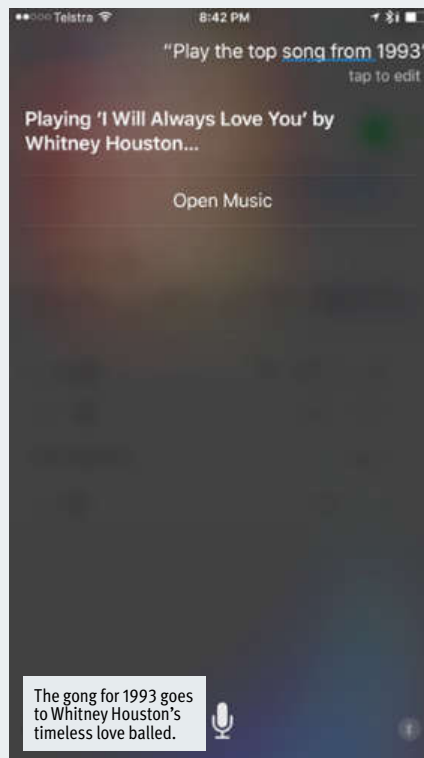
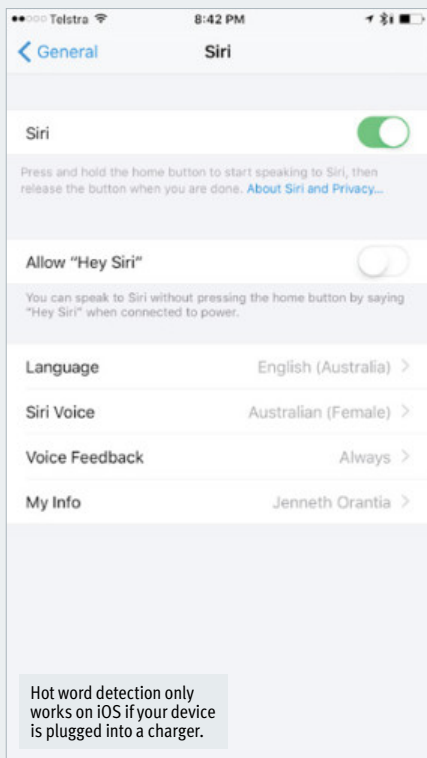
The Lifeproof nuuds adds IP68 waterproofing to the iPad 2 while keeping the screen completely exposed.



Unlike the fictional 'Never Nude' syndrome depicted by Tobias Funke in TV Show Arrested Development, NeverWet is a real thing.



Aquapac's range of waterproof cases are a better option for outdoor water activities such as kayaking and snorkeling, as they're waterproof to five metres.



repellant that keeps everything from couches and shoes to bricks and gardening equipment dry. Whether you can use it on your delicate electronics is another question, and we're not game enough to use it on our thousand-dollar smartphones. The manufacturer's hands-on product demo video shows the company president using it on an iPhone, however the instructions on the packaging warns against using it on electronics. Go figure.

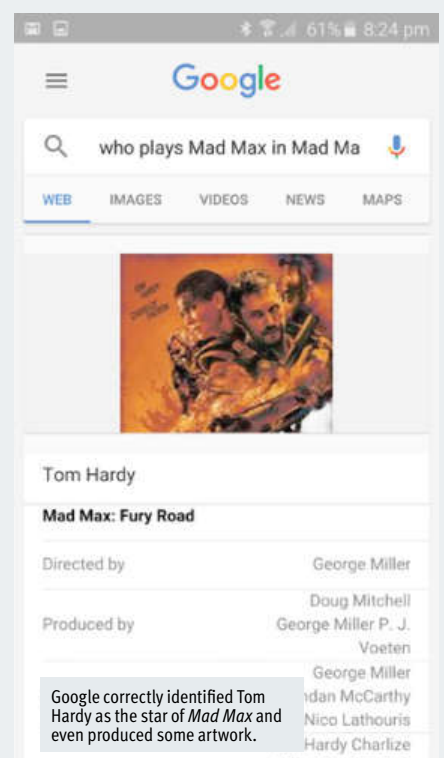
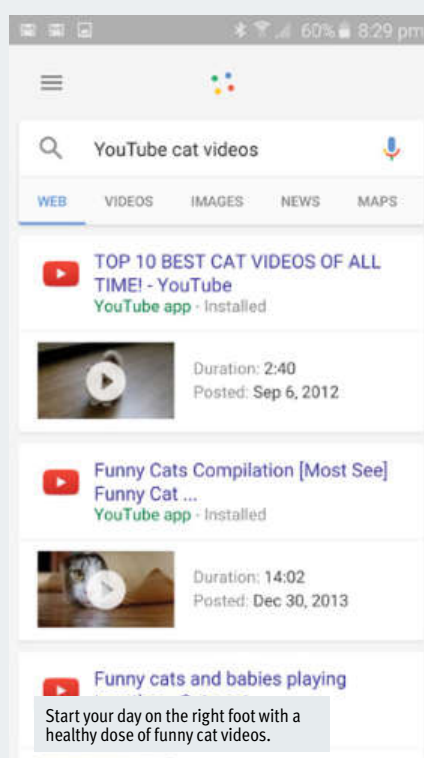
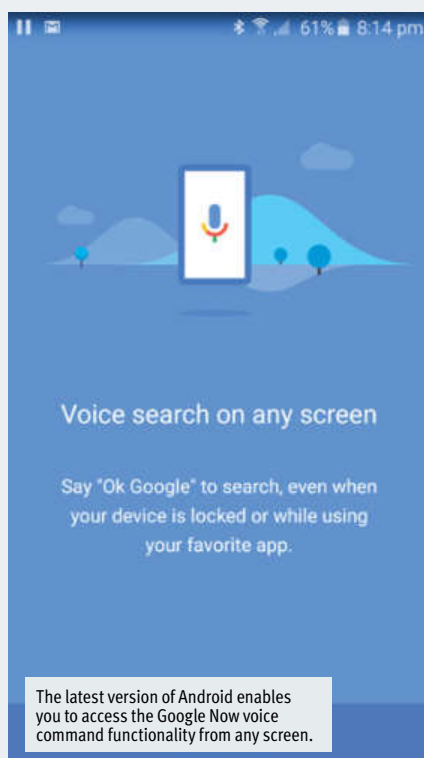
HANDS-FREE HELP

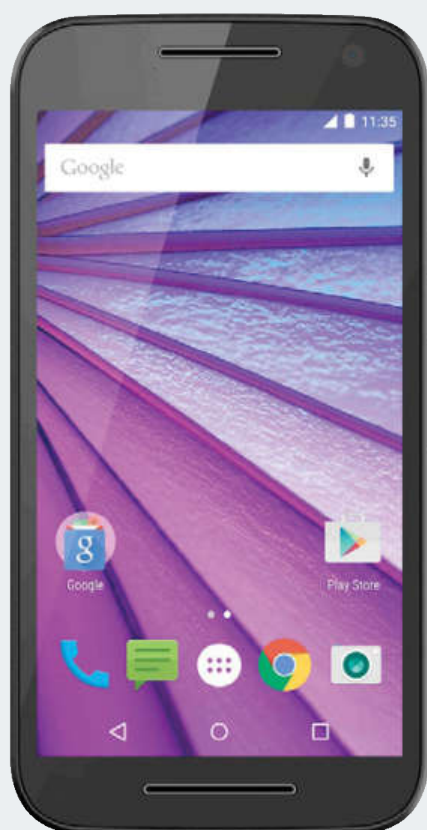
One of the downsides of using a smartphone or tablet in the shower is that the touchscreen doesn't deal well with water. One way to get around this is by using voice commands, and on the latest iOS or Android software, you can actually do quite a lot without having to touch the screen.

On the iOS platform, pressing and holding on the Home button until you hear two beeps will bring you to the Siri screen, where you can

perform a variety of tasks with the right voice commands. You don't even need to memorise specific commands, as Siri is clever enough to understand what you mean in plain English. If you're using your iPhone or iPad as your in-bathroom music player, you can employ Siri as your personal DJ with commands such as "Play the top song from 1993" or "Play more like this" when you hear a song that you like.

If you're getting ready for work in the morning, Siri scores well as a personal





assistant, with the obvious benefit that you don't have to be wearing pants to get it to do your bidding. You can ask Siri to rattle off your daily schedule, help you with your wardrobe choice by telling you what the weather will be, and send off any emails or text messages to help you kick start the day.

You can even get Siri to turn on automatically (ie. without having to press and hold the Home button) when you say 'Hey Siri', but once this feature is activated (in Settings > General > Siri > Allow 'Hey Siri'), for models prior to this year's, it only works if your iPhone is currently connected to power. While we don't recommend charging your electronics near water sources, Lifeproof's Fre Power for iPhone 6 Case (not available for the Plus, unfortunately) offers a neat solution, combining an IP68 waterproofing with a battery pack that can keep your iPhone charging in the bathroom without posing an electrical hazard.

The Android platform is a little more easygoing with the hot word detection, and provided you're running one of the latest versions of the operating system, you'll be able to bring up the voice command capability from any screen simply by saying 'OK Google' without needing to plug it into a charger.

The relevant setting to enable this differs between devices. On stock Android devices, go to Settings > Voice > "Ok Google" detection and enable the 'From any screen' option. On the Samsung S6, it can be found by going to Settings > Language and Input > Google voice

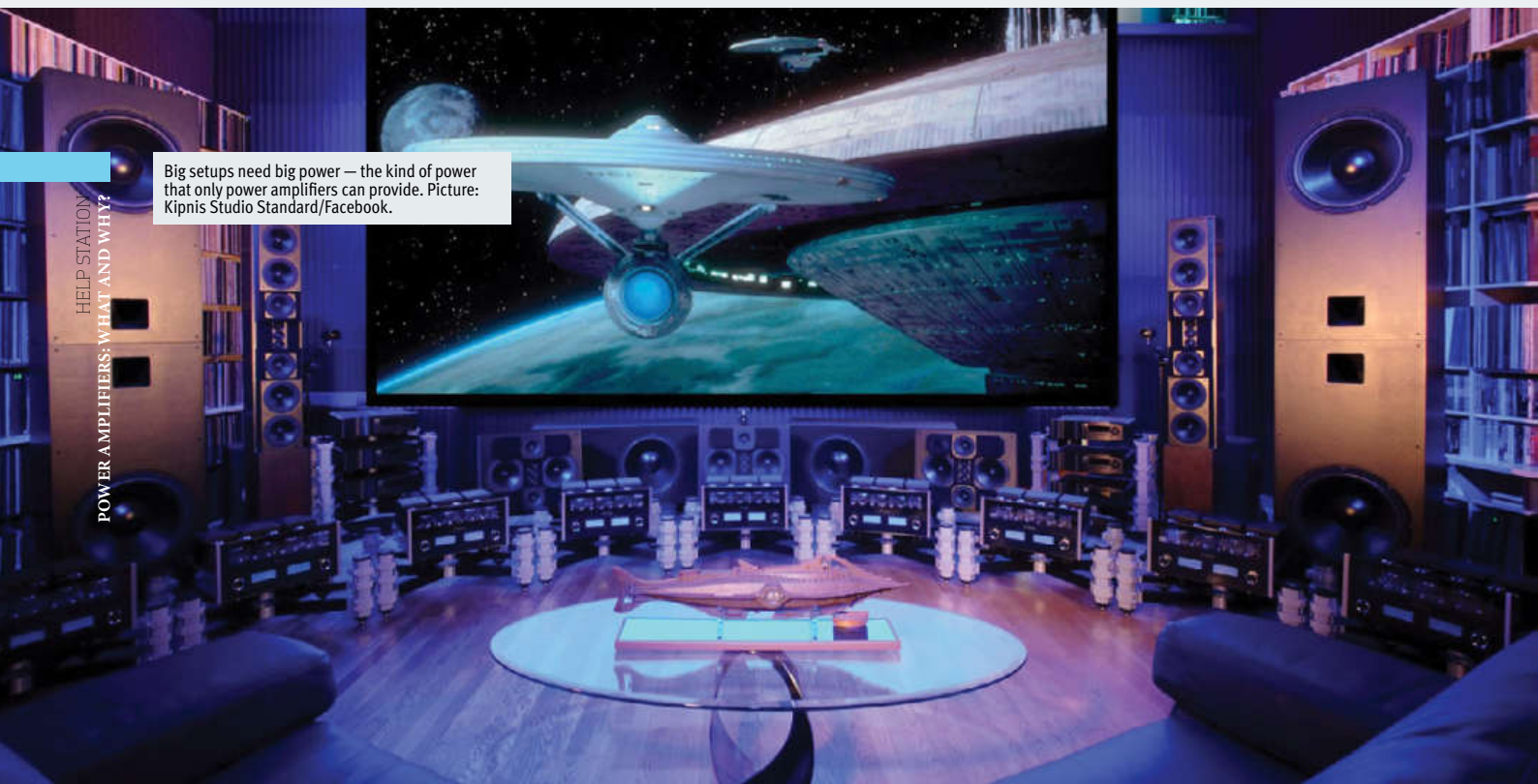
typing > "Ok Google" detection.

The variety of voice commands available on Android is similar to Siri, but not identical. If you're suddenly struck with an overpowering urge to know who plays Max in the latest *Mad Max: Fury Road* movie (a hint: it's not Mel Gibson) while you're brushing your teeth,

Google Now will happily tell you by retrieving the information from Wikipedia, while Siri won't. You can also use Android's Google Now functionality to set reminders (either based on time or location), ask whether there's currently any traffic on the way to work, and even get it to display a list of funny cat videos on YouTube. ■



Big setups need big power — the kind of power that only power amplifiers can provide. Picture: Kipnis Studio Standard/Facebook.



[AMPED UP]

Power amplifiers: what and why?

SERIOUS SYSTEMS NEED SERIOUS AMPLIFICATION, AND A POWER AMP GIVES YOU THAT.

[SIMON CHESTER]

YOU'RE PROBABLY ALREADY aware that, in the world of hi-fi enthusiasts, there is a sort of hierarchy of quality: all-in-one units like micro systems and soundbars are thought of as inferior to 'component' or 'separates' setups, which have a standalone A/V receiver or integrated amplifier to drive your speakers, and to which you connect separate audio and video sources, like Blu-ray players, turntables, media streamers, and so on.

What you may not be aware of, however, is that true audio fanatics go one step further and separate their A/V receiver or integrated amplifier into a further two discreet units: a pre-amplifier — the part that selects the sources, handles the volume and so on — and a power amplifier — a chunky box that does nothing but power your speakers.

There are two core arguments for this: one is that you can keep the low-voltage pre-amp

signals — the sound coming from your source — and the high voltage amplified signals — the ones ready to power your speakers — separate from each other, reducing interference. The other, more pertinent, argument is that, by removing the pre-amp components from a chassis, you make room for a much larger power supply and amp — resulting in louder maximum volume, and greater dynamic range for more definition.

Indeed, the extra space in a power amp chassis means that the amplifier stage can then be of the larger and warmer class 'AB' or 'A', rather than the cheaper, smaller, cooler class 'D' amps seen in most of today's receivers, and which are held by many audio enthusiasts as inferior for critical listening.

Now, while this setup requires the separation of pre-amp and power amp, the pre-amp doesn't have to be a new unit: your

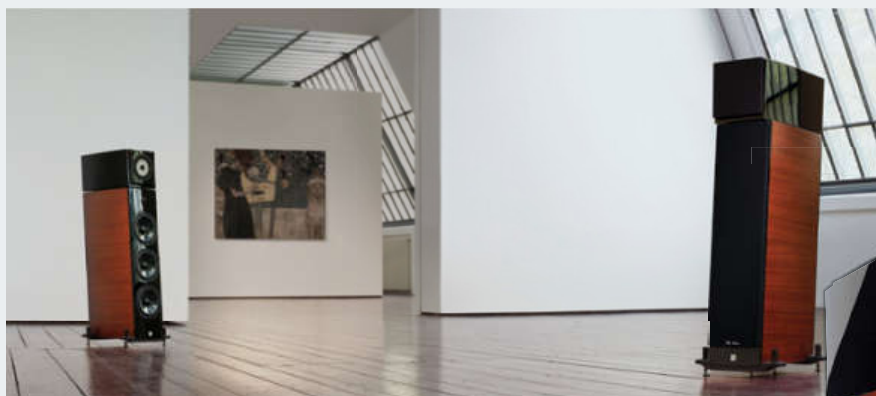
existing integrated amplifier or A/V receiver will continue to do its job as pre-amp. By adding an external power amp, all you're doing is bypassing its amplifier section.

All of these benefits are well and good, but there is one formidable hurdle to switching to a setup like this: the price. Power amps, for the reasons outlined above, are enthusiast-grade equipment; they are built better, and they cost more — much more — than your standard A/V receiver, despite the receiver coming with a laundry list of features and nominally (if not really) the same output power. So, you can expect to pay thousands for the good stuff, and tens of thousands and beyond for the crazy 'audiophile' stuff.

However, unlike your A/V receiver, a good power amp will last you decades; as it's just amplifying a signal, it isn't affected by leaps in technology standards and features. Thus, once

Power amps often provide three-pronged XLR inputs for balanced audio connections, which eliminate interference during transmission.





Exotic, 4 ohm speakers – usually those with large or multiple woofers – like these Vienna Acoustics Klimate benefit greatly from the extra oomph of a power amp.



Audio purists will often use multiple mono power amplifiers – one per speaker – to maximise the power in their system.



POWER AMPLIFIERS: WHAT AND WHY?

purchased, you don't have to worry about the next big audio or video standard making it obsolete; to get the latest features, you need only upgrade your A/V receiver or processor, just as before.

Armed with the knowledge that a good power amp of old is still a good power amp, you can actually find some real bargains on the second-hand market. While they do retain their value pretty darn well, you can get a solid power amp only a couple of decades old (or less) for under \$1000, perhaps well under.

But before you get that far, let's talk a bit more about why power amplifiers are used, and figure out if you would benefit from one.

WHY USE AN EXTERNAL AMP AT ALL?

As mentioned earlier, the primary reason that you'd add an external power amplifier (or two) to your system is for MORE POWER. More power doesn't just mean you can drive larger speakers, or crank your existing ones up a little louder; it also means that you'll have enough power to reproduce the more difficult lower frequencies (important for systems without subwoofers), or, at higher volumes, enough headroom to deal with sudden increases in volume (we're talking 'peaks' like explosions in movies or surprise trumpet solos in music) without clipping.

Further, in multi-channel surround systems, adding a power amp to drive even just your front speakers will not only improve their performance — often resolving user's complaints that their A/V receiver isn't "musical" enough — but also reduce the burden on your receiver's internal amplifier and allow it to give more oomph to those speakers still attached to it. Given that rear/surround speakers are usually smaller than the

front ones, there's no real need for further amplification beyond what your receiver generally provides.

However, you may need to run a test tone and check that your speakers are all running at equal volume, and adjust your power amp's gain/trim controls, or your receiver's pre-amp output levels, so that they match. You'd be best using a dB meter for this, but an app on your phone should suffice.



Separating the pre-amp (above) and power amp (below), like this NAD C 165BEE and C 275BEE pair, can result in superior — and louder — audio.



A/V receivers with “pre out” connections are ready for a power amp – there’s no need to add a separate pre-amp.

If you’re a real power fiend, desperate to further amplify all of your surround speakers, you may be pleased to know that you can buy multi-channel power amps, too – one well-priced-but-well-built US company that makes them (and ships to Australia) is Emotiva. Alternatively, you can use multiple power amps – and, if money is no object, most power amps can be bridged to run in mono mode, meaning you can have one power amp per speaker. May your tinnitus quake at the very prospect.

IS IT WORTH IT?

As money is an object for most of us, however, you’ll want to be sure that investing well upwards of a grand in a power amp will make a useful difference. Gene DellaSala from Audioholics (www.audioholics.com/home-theater-connection/connecting-an-external-amp-to-a-receiver) has four main reasons why you would want more power in your system:

- * You like your music or movies loud. Like sustained 90dB+.
- * Your hi-fi is in a large room, say above 25m².
- * Your speakers are inefficient: either 4 ohm, <90dB efficient, or both.
- * You don’t use a subwoofer to lighten the load on your speakers, and don’t want one.

Now if you meet only one of these requirements, the investment into a power amp isn’t likely worth it (unless you can find a

used one for a bargain price, that is). But if you meet two or three, then you may see value in adding more power to your system.

Before you do, however, you’ll need to check that your existing equipment can work with a power amp: that is, if your A/V receiver or integrated amplifier has ‘pre-amp outputs’ (sometimes called ‘pre/pro outputs’).

Now, what’s interesting – if not surprising – about power amplifiers is that they only do one job: amplify. What I mean is that they don’t even control the volume; your existing receiver will continue to do that, and every other task, too. You really are just replacing its internal amplifier with an external one.

Given the fixed amplification of power amps, there are some considerations that you now need to make: namely, how much signal will your existing receiver give to your power amplifier, and how much volume will that result in?

I’ll skip over the maths here (see the ‘Voltage, amplification, and output’ box for a link to it, though), but there is one thing that you must understand: your power amp can only reach its maximum power output if the pre-amp outputs provide it with enough signal (voltage, in this case). If your receiver can only output one volt or less on its pre-amp outputs, then your power amp may not be able to reach its full potential, even with your receiver’s volume knob turned to maximum.

What this translates to is this: if you have

a crappy, noisy, or low-level pre-amp, then a power amp is only going to make those faults more audible, and/or provide amplification only marginally better than your existing integrated amplifier. With this in mind, it makes no sense to pair a \$200 A/V receiver with a \$2,500 power amplifier. The old adage always remains true: garbage in = garbage out.

In saying that, however, the average quality of A/V receivers has been steadily rising over the years, and if your receiver is of a reputable brand and was of a price-point high enough to include pre-amp outputs at all, then you’re probably ok to add a power amplifier to it – after all, that’s the reason the outputs are there. To be sure, you can search online for reviews that went to the effort to measure the pre-amp output, such as those at audio enthusiast sites like Audioholics. An output of around 2v or more should be enough to drive your chosen power amp. Further, you should also check with the seller if there is a return policy if you’re not happy with your new power amp.

HOW MUCH POWER?

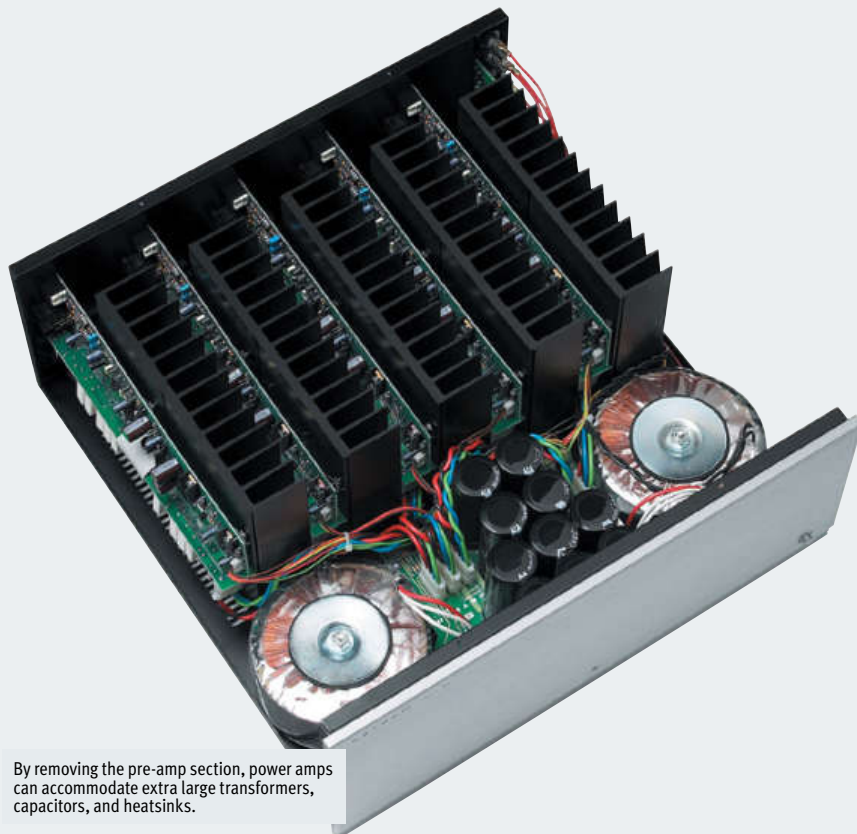
So, how much power should you go for when choosing a new power amp? It’s generally held that the output of A/V receivers isn’t quite as good as it says on the box, so – and this is usually a bit surprising – using a 75w stereo power amp to drive your front speakers will likely be better than using your 100w per channel A/V receiver to drive them. In short,



A/V processors, like this flagship 11.2 channel Marantz AV8802 (RRP \$6,490), are effectively high-end A/V receivers without the amplifier stage – for those obsessed with getting the best sound.



The Emotiva XPA-5 is a 5x 200w (@ 8 ohm) surround sound power amp available for a very reasonable US\$899 ex worldwide shipping.



By removing the pre-amp section, power amps can accommodate extra large transformers, capacitors, and heatsinks.

VOLTAGE, AMPLIFICATION, AND OUTPUT

If you're interested in how your pre-amp will affect your power amp's output, in terms of quality and volume, or to learn more about how dB values relate to amp power and volume, then you should read the excellent Audioholics article, "Amplifier Voltage Gain Explained – Matching Amp to Preamp" at www.audioholics.com/audio-amplifier/amplifier-voltage-gain.

A/V PROCESSORS INSTEAD OF RECEIVERS

If you're running a no-compromise system with power amps for each channel, then you may prefer an A/V processor rather than a normal receiver. Processors are high-grade pre-amplifiers that come with all the whiz-bang features of an A/V receiver. However, despite not containing amplifiers they usually cost more than most consumer-grade A/V receivers that do contain amps.

don't feel that you need to fork out the big dollars for a 200w+ model – unless, of course, you're driving exotic, inefficient, high-impedance loudspeakers.

Further to this, a doubling of amplifier output does NOT mean a doubling of maximum volume. In fact, a doubling of amplifier power – whether it's from 10w to 20w or 100w to 200w – only results in an increase of 3dB to the maximum volume, whereas a doubling of perceived volume requires somewhere between a 6 to 10dB increase, meaning between 4x and 10x more power is needed. So, if you're looking at two power amps from the same manufacturer, but one has a 75w output and the other a 100w output, and the price difference is more than a couple hundred dollars, then it's probably only worth the extra if it comes with some other features, such as a different amplifier design or better power supply – there won't be any noticeable difference in the volume that the two can put out.

However, if you find a reputable-brand, high output power amp at a cost you're willing to spend, don't feel bad for opting for more power. As I've said before: it's almost always better opting for too much power than too little, as having more maximum power will give more headroom to maintain dynamic range at volume without clipping.

And, as you'll want your power amp to last decades, buying one with more power means that you can always upgrade to hungrier, larger, and generally better sounding speakers later down the line. If your chosen power amp has gain/trim controls, or your receiver's pre-outs have adjustable output, you can always dial them down a touch to make sure that you're not sending too much power to your speakers before then, anyway, or else refrain from spinning your receiver's volume

control too far to the east.

But enough preamble, let's talk numbers. The technical specifications section of your speaker manual will tell you how much your speakers can handle: look for the "continuous power RMS" (or "long term" or something similar) value and their impedance (in ohms), and if the power amp you're looking at is significantly above that value (say, double) at the same impedance, then it's not a great idea to use it with your speakers, as a mistake with the volume knob may cause damage (they'll be perfectly fine at lower volumes, however). If it's equal to that value, or only 25% or so above it (say 200w speakers with a 250w amp), then they'll be fine together – just remember that the further above your speaker's peak RMS the power amp is, the more careful you need to be

in how far you turn it up and for how long. Finally, if the power amp you're looking at is less than the power rating of your speakers, don't bother.

Power amps, then, really are for the audio obsessed – those that want to get the very best out of a very good set of speakers. When paired with a modern A/V receiver, they can provide the means for a well-engineered, traditional style amplifier to be used for your music (where it matters most), without missing out on the latest features like digital crossovers, room and speaker calibration, and surround standards. And while the entry price is considerable, the investment is over a longer period than your standard A/V receiver, which goes some way to justifying it. Oh, and they're sick for parties, too. ■

The Azur 851w is Cambridge Audio's flagship power amp, delivering 200w per channel (stereo), or 500w bridged (mono), at 8 ohms for \$3499. Note the ventilation holes in the top: this thing runs hot.



The 85kWh version of Tesla's Model S uses 7104 of those 18650 cells.



[ZAPP]

You're my powerwall

ELECTRICITY PRICES HAVE RISEN MARKEDLY, JUST AS SOLAR-PANEL FEED-IN TARIFFS FALL. BUT NEW TECHNOLOGY AIMS TO REVOLUTIONISE OUR POWER USAGE.

[DARREN YATES]

THERE HARDLY SEEMS a tech topic more guaranteed to generate controversy these days than how best to meet Australia's electrical energy needs. Whether it's keeping coal-fired power stations or demanding more investment in renewable energy sources, such as wind, solar, thermal or hydro, everyone has an opinion, one way or another. But there is something of a revolution on the horizon that looks set to shift the debate from how we generate electrical energy to what we do with it once it's generated.

You might be used to thinking of batteries as a source of power for when you're on the move, but increasingly, as we move into a less-certain energy future, they're being seen as a solution for when you're at home as well.

PEAK DEMAND

At a macro level, power-generation authorities have to manage generation capacity to match consumer and business demand. Thanks to the 2000s' tech boom that saw us bulk up on everything from big-screen TVs to airconditioning, you see peak demand on hot days when everyone cranks up their reverse-cycle aircon. In fact, figures from the Australian Energy Regulator (AER) show peak-demand for electricity in New South

Wales alone rose from 10,200 megawatts (MW) in the summer of 1998/99 to just under 15,000MW in the 2011/12 summer season (tinyurl.com/oe7qrtz). To more efficiently handle that demand, the National Electricity Market (NEM) brings together the power generation output of Queensland, New South Wales, Victoria, South Australia and Tasmania into a wholesale market, where electricity is priced in five-minute lots. The Australian Energy Market Operator (AEMO) picks the cheapest bid prices from those generators and offers what amounts to a contract to deliver power. You can read more about it from the AEMO at tinyurl.com/q83k4yj.

Because we demand access to electricity 24/7, state authorities and private power generation companies have to plan for that peak demand, which has led to numerous issues. First, even if the peak happens just once a year, that capacity still has to be on hand — an expensive proposition not just in generation, but also transmission, or 'poles and wires'. Second, the price of electricity shoots up on those days as less cost-effective generators are brought on-line to supply demand. As a result, rising electricity prices and generous government rebates have seen solar photovoltaic (PV) systems become a

popular home renovation project over the last eight years or so.

But there's increasing buzz around the concept of storing and better utilising the power we already generate — and that's where batteries are becoming the hot topic.

LITHIUM-ION CELLS

Ever since Italian scientist Alessandro Volta figured out back in the early 1800s how to create stores of energy in a jar filled with alternating copper and zinc plates separated with paper soaked in salty water, we've been searching for ways to pack in greater amounts of energy into smaller and smaller batteries. And for the last 25 years, various forms of Lithium-ion have sustained an ever-increasing proportion of the world's billions of portable gadgets.

Japanese tech-giant Sony launched the first commercially-available Lithium-ion battery back in 1991. And like many tech inventions, the Lithium-ion battery has been the catalyst for more than a few legal stoushes over the years. By 1994, Lithium-ion capacity cost roughly \$3,000 per kilowatt-hour (kWh) to manufacture. Today, it's down to around \$250.

We're all familiar with AA and AAA-size cells with their nominal 1.5-volt rating. But



Tesla's Gigafactory for making batteries takes shape in the Nevada desert.

with Lithium-ion cells having a much higher 3.7-volt nominal voltage, they've also introduced new cell sizes and labels. One of the most common Lithium-ion cell types is the '18650', so called because of its 18mm diameter, 65mm length and cylindrical design (type '0'). Not much wider but quite a deal taller than the standard AA battery, 18650 cells power everything from laptops to cordless drills. According to one report, over 2.5 billion 18650 cells were manufactured in 2013 alone (tinyurl.com/q4ggg6w).

Today, they're even powering electric vehicles. US car manufacturer Tesla uses just over 7,100 Panasonic-made 18650 cells inside the 85kWh battery packs for its eye-catching Model S electric car. In fact, so bullish is Tesla CEO Elon Musk, his 'Gigafactory' currently being constructed in the US state of Nevada plans on churning out cells (possibly larger than the 18650) in their millions by 2020.

But if Tesla and other brands have their way, it won't just be cars these little pocket-rockets

power later this year — different forms of them will help run our homes.

TIME-SHIFTING ELECTRICITY USAGE

Right now, the energy market is gearing up for something of a revolution in how electricity is used — and its thanks in large to Lithium-ion technology. A quick look at the power bill for an average Australian household shows that electricity is commonly charged by 'time of use' (TOU) at peak and off-peak rates (you'll probably also have a 'shoulder' rate, which may be a fraction less than the 'peak' rate). If you're in Western Sydney and supplied through Origin Energy, for example, you're likely paying 31.8 cents per kilowatt-hour (31.8c/kWh) peak rate and 13.24c/kWh off-peak (between 10pm and 7am, tinyurl.com/owz32jff), as of July 1 this year.

But what if you could store up some of that off-peak power and use it during the daytime peak periods? That cheaper stored off-peak power could offset your peak power usage by

as much as 18.6c/kWh, on those rates. But combining storage with solar electricity via roof-top panels is where there's real interest.

AUSTRALIAN POWER STORAGE TRIALS

Tesla might have a Hollywood-like profile in this market, but it's not the only player looking for its slice. Japanese multinational Panasonic makes the 18650 cells used by Tesla, and in June, entered into a pilot project agreement with Australian power retailers ActewAGL (ACT), Snowy Hydro's Red Energy and Queensland's Ergon Energy to trial its own power storage wall in solar-equipped homes. The company believes its battery tech can help solar users double the consumption rate of their own solar energy generation from 30 to 60% (tinyurl.com/pppqezc).

The Panasonic storage battery (LJ-SK84A, tinyurl.com/nn78axa) is rated at 8kWh in capacity and can deliver 2kW of output power for up to four hours. To put that into perspective, a four-person household in NSW

The largest 18650 cell capacity is 3,400mAh, so take 9,800mAh claims with a grain of salt.



Panasonic 18650 cells power the Tesla Model S electric car.



Samsung SDI's Energy Storage System combines inverter and battery.



Panasonic's LJ-SK84A storage battery is on trial around Australia.



LG's Residential Energy Storage Unit is rated for 10 years/6000 cycles.



You can gang up to nine Powerwall batteries together to max capacity.

consumes roughly 23kWh per day (tinyurl.com/p3qwfcp).

Korean giants LG and Samsung are also getting into the Australian consumer storage market. LG Chem's Residential Energy Storage Unit (RESU) delivers 6.4kWh of storage with a 2kW charge/discharge rating. It's rated for at least ten years/6,000-cycle life and distributed through local suppliers including Solar Juice (tinyurl.com/q4nvwaj). Samsung SDI has three consumer models using Lithium-Manganese-Oxide (LMO) batteries, the largest being the three-phase AIO Series 8. Samsung's range is known as 'all-in-one' because it includes the solar (photovoltaic or PV) panel converter, the DC-AC inverter and the battery system in the one box (tinyurl.com/q4psfey).

TESLA POWERWALL SPECS

Meanwhile, the Powerwall has been so popular, reports are 2016 production has already sold out. Even so, the first lineup consists of two models — a 7kWh daily-cycle option and a larger 10kWh model for less-frequent weekly-cycle 'backup' use.

They're both guaranteed for ten years and according to the company, you can gang up to nine of the same units together for a maximum of 63kWh and 90kWh, respectively. Maximum in/out power loading is 2kW continuous and 3.3kW peak for short periods. However, the Powerwall includes the battery system only — you must separately purchase a DC-AC inverter to turn the power into AC mains, although all-inclusive packages are expected.

And that's the key thing when comparing specs — understand what you're getting. Does the unit include just the battery system or all of the converter/inverter subsystems to go with it? Does solar PV power require a DC-DC converter stage before charging the battery system, or does it support a more efficient direct-connect setup? These are all questions affecting the total cost.

WHAT'S IT ALL COST?

That's the big question. The answer depends on what you want to build, although in general, there are three options. First, there's

the battery-only setup for time-shifting your power usage. Second, you could add a storage system to an existing solar setup. The third option is to start from scratch and cost up an 'integrated PV and storage system' (IPSS) to take yourself closer to off-grid altogether.


Even if you sign up for just the time-shift option, you're up for the cost of the battery pack, a suitable DC-AC inverter and the cost of installation. Building a full IPSS using the Tesla Powerwall, for example, you're looking at around \$7,000-\$8,000 for the Powerwall install, plus another \$5,000-\$6,000 for a 3kW solar PV system. For other battery systems, experts say to expect prices north of \$1,200 per kWh, but prices will vary.

SHOULD I GET ONE?

If you're hoping to do your bit to reduce reliance on fossil fuels or just get yourself off the electricity grid, a storage battery system is obviously a must. But if saving money on your power bills is your prime goal, a storage system is a vastly more complicated question. You'll find a number of websites attempt to provide a simple cost-benefit analysis, but the only thing they seem to agree on is the fact that they don't agree. And it's not surprising, given the number of variables involved. Here's a short list of the biggies:

- * Cost and capacity of battery system
- * Number of charge cycles system is guaranteed for
- * Cost and capacity of DC-AC inverter
- * Cost and capacity of your solar panel setup
- * Current electricity tariffs
- * Your feed-in tariff for exported solar power
- * Your daily power consumption

When Tesla made its announcement back at the end of April, the Aussie dollar traded at around US\$0.80. At time of writing, it hovered



Technology
Wall mounted, rechargeable lithium ion battery with liquid thermal control.

Models
7 kWh
For daily cycle applications
10 kWh
For backup applications

Warranty
10 years

Efficiency
92% round-trip DC efficiency

Power
2.0 kW continuous, 3.3 kW peak

Voltage
350 – 450 volts

Current
5.8 amp nominal, 8.6 amp peak output

Compatibility
Single phase and three phase utility grid compatible.

Operating Temperature
-20°C to 43°C

Enclosure
Rated for indoor and outdoor installation.

Installation
Requires installation by a trained electrician. DC-AC inverter not included.

Weight
220 lbs / 100 kg

Dimensions
1300 mm x 860 mm x 180 mm

Certification
Powerwall will be compliant with relevant safety and electrical standards at market launch.

The Tesla Powerwall doesn't include a DC-AC inverter – that costs extra.



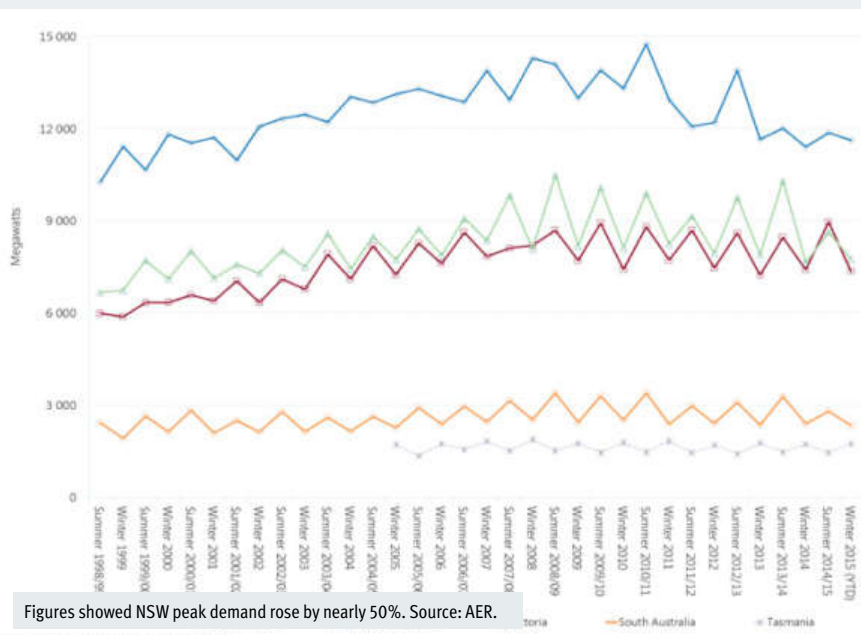
around the US\$0.70 mark, with some claiming even US\$0.60 is a possibility. Since this tech is all imported, a falling exchange rate will drive up prices, making the payback or 'break-even' period longer.

However, over the longer term, power prices are expected to rise, while solar and storage battery technology costs should continue to fall, as economies of scale ramp up, shortening the payback period and making it a more viable option.

GETTING FIT

Nevertheless, whether you jump aboard the storage wagon or not, change in the power generation industry is coming. If enough users buy into power storage systems and shift the charge portion of their power usage into off-peak periods, growing off-peak demand will likely see power retailers push up their off-peak prices. And if shifting consumer demand closes the gap between peak and off-peak rates, the value of time-shifting power usage alone is negated. Ultimately, combining solar panels and storage batteries will provide the most reliable gains. AEMO's Emerging Technologies White Paper for June 2015 (tinyurl.com/q6edtwp) is well worth a read.

Ironically, consumers who jumped into solar early, when buy-back or 'feed-in tariffs' (FITs) were far more generous than they are now in some states, are still likely better off selling excess energy than storing it — provided your FIT still exceeds your retailer's peak tariff. If, however, your FIT is below your off-peak tariff and you're still grid-dependent for some of your energy needs, you're more likely better off storing your own electricity. The NSW Independent Pricing & Regulatory Tribunal (IPART) fact sheet on FITs (tinyurl.com/q4e83fb) is another must-read.



DO YOUR HOMEWORK

Global financial services company UBS' Australian analysts were reported in May to have calculated that Tesla's Powerwall would pay for itself in around six years in Australia (tinyurl.com/nmyje3v). However, the falling Australian dollar, the analysis' seemingly-low installation and DC-AC inverter costs make us think that timeframe might be a bit optimistic.

At the very least, it should highlight the complexity of trying to come up with a one-size-fits-all answer on whether to buy, wait or forget storage battery systems. Frankly, we don't think there is just one answer. But here's what we do think:

If you're considering a storage system without solar panels (that is, simple time-shifting your usage), you need the gap between peak and off-peak tariffs to remain as wide

as possible to maximise your investment.

If there's no difference between those tariffs, there's zero financial gain in time-shifting power storage.

If you already have a solar PV system and your FIT exceeds the off-peak (or if you're lucky, above the peak) rate, skip batteries — just sell your excess power.

If you have a solar system but a FIT that's below the discounted off-peak rate, a storage system could help better utilise the power your solar panels make.

Bottom line, though, unless you or someone else sits down and calculates your specific situation with respect to costs, FITs and power usage, any quoted one-size-fits-all payback period or return-on-investment figure will likely be wrong for you. ■


BUYER'S GUIDE

YOUR READY RECKONER TO THE BEST TECHNOLOGY PRODUCTS




The *TechLife* team find the best budget, value and performance products, and the latest releases in the top technology categories. If you believe there are other products that deserve the title in any of the tech categories, let us know and give us your reasons why in 50 words or less. Equally, if there's a hot new product that's worthy of attention, we want to know. Send your email to techlife@futurenet.com.

ADSL ROUTERS
(WITH MODEM)




[BEST BUDGET]
Netgear DGN2200

\$99 | www.netgear.com.au
It's only 802.11n, but it has the basics you need plus an excellent, easy-to-use interface.




[BEST VALUE]
TP-Link Archer D7

\$170 | www.tp-link.com.au
The UI is a little no-frills, but once set up this is a very solid AC1900 router for a price well below the average.




[BEST PERFORMANCE]
ASUS DSL-AC68U

\$300 | www.asus.com/au
It ain't cheap, but if you want it all, this 802.11ac unit is fast and packed with handy enthusiast features.




[NEW ON SHELF]
Netgear Nighthawk D7800

\$549 | www.netgear.com.au
This 'wave 2' 802.11ac ADSL router offers new top Wi-Fi speeds, but will require compatible clients to get there.




[BEST BUDGET]
Netgear WNR2000

\$70 | www.netgear.com.au
It's only 802.11n, but for around \$70 this four-port router will cover the basics.




[BEST VALUE]
TP-Link Archer C7

\$150 | www.tp-link.com.au
This modemless version of the D7 (above) has all the basics you'll need to set up a 1,300Mbps AC network.




[BEST PERFORMANCE]
ASUS RT-AC87U

\$310 | www.asus.com/au
This full-featured unit is overflowing with options and settings, plus it has super-fast wireless.




[NEW ON SHELF]
Linksys EA8500

\$400 | www.linksys.com/au
The latest 802.11ac router from Linksys adds MU-MIMO to the mix, which should mean faster speeds for all your devices.




[BEST WIRELESS EXTENDER]
Netgear EX6200 WiFi Range Extender

\$129 | www.netgear.com.au
This AC extender is capable of speeds up to 867Mbps, has great range and can host storage via its USB 3.0 port.




[BEST WIRELESS BRIDGE]
Linksys WUMC710

\$140 | au.linksys.com
This 802.11ac bridge is a great way of linking a up to four wired network devices to a 1,300Mbps AC network.




[BEST POWERLINE ADAPTER (BUDGET)]
Netcomm NP507

\$140 | www.netcomm.com.au
These powerline plug adapters are a little big, but include socket passthrough and fantastic speeds.



[BEST POWERLINE ADAPTER WITH WI-FI EXTENSION]
Netcomm NP508


\$145 | www.netcomm.com.au
If you want to add wireless extension onto powerline capabilities, this topped our 2.4GHz Wi-Fi speed tests.



[BEST BUDGET]
Lenovo Iomega IX2

\$125 (DISKLESS) | www.lenovo.com
You'll need to BYO drives, but this very affordable two-bay NAS offers impressive features for the price.


PRICE CHANGE



[BEST VALUE]
ASUSTOR AS-202TE


\$320 (DISKLESS) | www.asustor.com
This two-bay NAS offers excellent features and can double as a media player, via XBMC and HDMI-output.

PRICE CHANGE



[BEST PREMIUM]
Synology DS414j

\$440 (DISKLESS) | www.synology.com
If you need more space, this four-bay unit runs Synology's excellent NAS OS, which lets you add features via apps.




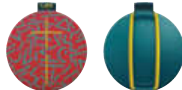






















[NEW ON SHELF]
Thecus N5810PRO

\$1,100 | www.thecus.com
This high-end 5-bay NAS is for users who need top speeds and, with a Celeron CPU, plenty of horsepower.

NETWORKING ACCESSORIES
(NO MODEM)

NETWORK ATTACHED STORAGE DEVICES

 <p>[BEST BUDGET] Creative Muvo Mini</p> <p>\$70 au.creative.com This Bluetooth speaker is compact and waterproof but still delivers great sound. Nicely priced, too.</p>	 <p>[BEST VALUE] Klipsch GiG</p> <p>\$200 www.klipsch.com.au A portable speaker that punches well above its weight in terms of sound quality and isn't overly costly.</p>	 <p>[BEST PERFORMANCE] Lenco PlayLink 4</p> <p>\$399 www.amberonline.com.au With an optional battery for portable play, this Bluetooth and Wi-Fi speaker is highly versatile and sounds fantastic.</p>	 <p>[NEW ON SHELF] UE Roll</p> <p>\$150 www.ultimateears.com This disc-shaped speaker's very portable and waterproof to boot. It doesn't sound half-bad either.</p>	BLUETOOTH SPEAKERS BUYER'S GUIDE READY RECKONER
 <p>[BEST BUDGET] Shure SRH440</p> <p>\$130 www.jands.com.au Bright, clear sound and great bang for buck.</p>	 <p>[BEST VALUE] Audio-Technica ATH-M50X</p> <p>\$199 www.audio-technica.com.au A well-priced set of over-ear headphones with fantastic audio and detachable cables.</p>	<p>NEW ENTRY</p>  <p>[BEST PREMIUM] Sennheiser Momentum</p> <p>\$300 en-au.sennheiser.com These over-ear cans offer fantastically rich audio that's great for most music types. Real crowd-pleasers.</p>	 <p>[BEST WIRELESS] Plantronics BackBeat Pro</p> <p>\$300 www.plantronics.com/au This Bluetooth set of cans blew us away with their great acoustics and noise-cancelling capabilities.</p>	
 <p>[BEST BUDGET] Epson EB-W130</p> <p>\$690 www.epson.com.au "This compact 3LCD, WXGA unit has good features and image quality and decently priced lamps."</p>	 <p>[BEST VALUE] Western Digital WD TV Live</p> <p>\$120 www.wdc.com It beats many TVs for video format support and its fast processor supports 1080p network streaming.</p>	 <p>[BEST PERFORMANCE] Western Digital WD TV Live Hub 1TB</p> <p>\$230 www.wd.com A media player done right, this unit can play and serve video to other devices. Easy to use and well-featured.</p>	 <p>[NEW ON SHELF] Google Nexus Player</p> <p>\$130 play.google.com This official Android-powered media player also includes access to apps and games.</p>	
<p>NEW ENTRY</p>  <p>[BEST VALUE] Epson EB-W120</p> <p>\$580 www.epson.com.au This compact 3LCD, WXGA unit has good features and image quality and decently priced lamps.</p>	<p>PRICE CHANGE</p>  <p>[BEST PORTABLE] Optoma ML550</p> <p>\$1,130 www.amberonline.com.au This pico projector fits in the palm of your hand and delivers a respectable 500 ANSI lumens brightness.</p>	 <p>[BEST HOME THEATRE] BenQ W1070</p> <p>\$999 www.benq.com.au BenQ's latest 1080p home theatre unit boasts a lower price and longer lamp life than the W1100.</p>	 <p>[NEW ON SHELF] LG MiniBeam PG60</p> <p>\$999 www.lg.com/au This compact and portable home-theatre projector will go anywhere, though its not high specced.</p>	
 <p>[BEST BUDGET] Samsung UA40J6200</p> <p>\$1,100 www.samsung.com/au A smaller, cheaper option, this 40-inch 1080p LED set offers very good picture quality and smart TV features.</p>	 <p>[BEST VALUE] Samsung UA55J6200</p> <p>\$1,700 www.samsung.com/au Samsung's new 2015-model 55-inch 1080p LED TV still delivers great image quality at a fair price.</p>	 <p>[BEST PREMIUM] Samsung UA60JU6400</p> <p>\$2,700 www.samsung.com/au This 60-inch telly is our pick if you want to jump into 4K/UHD, balancing a good price with excellent image quality.</p>	 <p>[NEW ON SHELF] LG 55EC930T</p> <p>\$3,999 www.lg.com/au This comparatively-affordable 55-inch, 1080p OLED set promises dazzling colours and amazing contrast.</p>	DATA PROJECTORS TVS
 <p>[BEST BUDGET] ASUS F553MA-SX985B</p> <p>\$499 www.asus.com/au Covers the basics, with a 15.6-inch screen, Pentium CPU, 4GB RAM and a 500GB hard drive for a nice price.</p>	 <p>[BEST ULTRABOOK] Apple MacBook Air 13-inch</p> <p>FROM \$1,399 www.apple.com/au This thin, lightweight unit has an aluminium unibody chassis, fast CPU and is well-priced for an ultrabook.</p>	 <p>[BEST PERFORMANCE] ASUS G751JT</p> <p>\$2,499 www.asus.com/au This unashamedly huge 17-inch desktop replacement packs heaps of power and a GTX 970M GPU.</p>	 <p>[NEW ON SHELF] Venom BlackBook 17 (2015)</p> <p>\$3,899 www.venomcomputers.com.au A monstrous high-performance laptop with a price to match, but the build-quality and performance are first-class.</p>	
LAPTOPS, TABLETS & SMARTPHONES LAPTOPS				

SMARTPHONES
- ENTRY-LEVEL



[BEST WINDOWS]
Microsoft Lumia 635

\$180 | www.nokia.com
A simple and elegant WP8 handset with 4G. A solid entry-level choice.



[BEST BIG SCREEN]
Motorola Moto G (2014)

\$269 | www.motorola.com.au
This upgraded Moto G packs all the basics and then some; dual-SIM 3G, 5-inch 720p LCD and 8GB storage.



[BEST PERFORMANCE]
LG G3 (D855)

\$469 (16GB) | www.lg.com/au
The G3 is clean and sleek, with a 5.5-inch IPS display, speedy processor and very good price.



[NEW ON SHELF]
Motorola Moto G (2015)

TBC | www.motorola.com/au
Much like it's predecessor (left), but with faster internals, waterproofing and 4G support.

SMARTPHONES
- PREMIUM



[BEST BUDGET]
Motorola Moto X (2014)

\$550 (16GB) | www.motorola.com/au
An excellent 5.2-inch all-rounder with frequent OS updates. Shop around for the best price.



[BEST BIG SCREEN]
Samsung Galaxy Note 5

From \$1,099 | www.samsung.com/au
Samsung's fifth Note adds a sleek new metal chassis, glass front and back but keeps the great 5.7-inch AMOLED screen.



[BEST PREMIUM]
Apple iPhone 6S

From \$1,079 | www.apple.com/au
Basically the same as last years, but includes a pressure-sensitive '3D Touch' display, better camera and faster internals.



[NEW ON SHELF]
LG G4

From \$869 | www.lg.com/au
The new LG flagship phablet includes a stunning 5.5-inch display and optional leather back.

TABLETS
- ENTRY-LEVEL

LAPTOPS, TABLETS & SMARTPHONES



[BEST BUDGET]
Samsung Galaxy Tab 4 8.0

\$240 (16GB) | www.samsung.com/au
It's getting a little long in the tooth, but this 8-inch quad-core Android tablet is our current budget pick.



[BEST COMPACT]
Apple iPad mini 2

\$369 (16GB) | www.apple.com/au
With a Retina display, the iPad mini 2 is fantastic value if you want a small tablet with all the frills.



[BEST PERFORMANCE]
Apple iPad Air

\$499 | www.apple.com/au
This iPad recently saw a \$100 price drop, which makes it the best-performing tablet under \$500.



[NEW ON SHELF]
Microsoft Surface 3

\$699 (64GB) | www.microsoft.com
A lower-end, Intel Atom-powered alternative to the Surface Pro, but still runs the full version of Windows.

TABLETS
- PREMIUM



[BEST BUDGET]
Apple iPad Air

\$499 | www.apple.com/au
It may be two years old, but the iPad Air is the best-performing tablet at this \$500 price.



[BEST VERSATILITY]
Microsoft Surface Pro 3

\$1,130 | www.microsoft.com.au
The official Windows 8.1 Pro tablet has a stylus and runs traditional Windows software.



[BEST PERFORMANCE]
Apple iPad Air 2

From \$619 | www.apple.com/au
The second-gen iPad Air goes even slimmer and lighter than before and has unbelievably fast internals.



[NEW ON SHELF]
Samsung Galaxy Tab S2

From \$700 | www.samsung.com/au
Samsung's most iPad-like tablet is also its best, with a 9.7-inch AMOLED screen, super-thin body and microSD expansion slot.

BLUETOOTH TABLET
KEYBOARDS

GADGETS & ACCESSORIES



[BEST FOR IPAD 2/3/4]
Logitech Keyboard Case for iPad

\$90 | www.logitech.com
Offers good protection and comfy, responsive keys on a budget.



[BEST FOR IPAD AIR]
Belkin QODE Slim Keyboard Case

\$110 | www.belkin.com/au
A great keyboard and vibrant case with a kickstand make this a great option for iPad Air.



[BEST FOR IPAD MINI]
Logitech Ultrathin Keyboard Cover

\$90 | www.logitech.com
The Ultrathin combines a fantastic-quality keyboard with a metal-backed case.



[BEST FULL-SIZED KEYBOARD]
Logitech Tablet Keyboard

\$120 | www.logitech.com
If you want the full-sized typing experience, this is your best bet.

DIGITAL
CAMERAS



[BEST BUDGET]
Nikon CoolPix S3300

\$150 | www.nikon.com.au
This compact camera is available in eight colours and has an ultra-slim body with 6x wide-angle lens.



[BEST COMPACT SLR]
Olympus OM-D E-M10

\$850 (14-42mm LENS) | www.olympus.com.au
A MILC with lots of lenses, fast shooting and a high-res viewfinder at a great price.



[BEST DIGITAL SLR]
Sony Alpha SLT-A65

\$1,110 | www.sony.com.au
A fantastic prosumer camera that lives up to its great specs.



[NEW ON SHELF]
Canon EOS 750D

\$980 | www.canon.com.au
This beginner's DSLR is a great place to learn the intricacies of pro shooting (and for a fair price).

 <p>[BEST POWER BANK] TP-Link TL-PB10400</p> <p>\$50 www.tp-link.com.au This 10,400mAh power bank will let you recharge your smartphone or tablet anywhere and weighs just 241g.</p>	 <p>[BEST WIRELESS HARD DRIVE] WD My Passport Wireless 2TB</p> <p>\$330 www.wd.com Take your media collection with you and play it back from Android and iOS devices with this Wi-Fi hard drive.</p>	 <p>[BEST STYLUS] Adonit Jot Pro</p> <p>\$45 www.adonit.net This one's great for scribbling notes on Android and iOS tablets and doesn't cost the Earth.</p>	 <p>[BEST MOBILE GAMEPAD] iPega PG-9025</p> <p>~\$25 www.dx.com You'll need to buy it online, but this gamepad is nice and responsive and works with both iOS and Android.</p>	<div>TABLET & SMARTPHONE ACCESSORIES</div> <div>BUYER'S GUIDE READY RECKONER</div>	
 <p>[BEST BUDGET] Toshiba Canvio Basics 1TB</p> <p>\$90 www.toshiba.com A compact portable hard drive with USB 2.0, 3.0 and backward compatibility.</p>	 <p>[BEST VALUE] Western Digital My Passport Ultra 2TB</p> <p>\$149 www.wd.com Great value, with lots of storage, good software and USB 3.0 support.</p>	 <p>[BEST PERFORMANCE] Seagate Backup Plus Fast 4TB</p> <p>\$400 www.seagate.com This speedy USB 3.0 drive transfers data at up to 220MB/s — twice as fast as most others.</p>	 <p>[NEW ON SHELF] Western Digital My Passport Ultra 3TB</p> <p>\$280 www.wd.com A big-capacity drive that isn't too bulky to take with you. The price is decent too.</p>		<div>GADGETS & ACCESSORIES</div> <div>PORTABLE HARD DRIVES</div>
 <p>[BEST SMARTWATCH FOR ANDROID] LG G Watch R</p> <p>\$349 play.google.com/devices The G Watch R runs Android Wear and, best of all, it actually looks like a watch.</p>	 <p>[BEST SMARTWATCH FOR IOS] Pebble Time</p> <p>US\$200 getpebble.com This new colour e-paper smartwatch has great battery life and one of the most mature app ecosystems.</p>	 <p>[BEST FITNESS BAND] Fitbit Charge HR</p> <p>\$200 www.fitbit.com This top-end tracker from Fitbit's latest range offers heart-rate tracking and a handy display for a fair price.</p>	 <p>[BEST EXERCISE HEADPHONES] Jabra Sport Pulse Wireless</p> <p>\$250 www.jabra.com These in-ear buds connect to your phone via Bluetooth and have integrated heart-rate monitoring.</p>		<div>WEARABLES</div>
 <p>[BEST BUDGET] Dell S2340L</p> <p>\$230 www.dell.com.au A solid all-rounder, this 23-inch IPS display has deep colours and a nice narrow bezel.</p>	 <p>[BEST VALUE] Dell P2714H</p> <p>\$440 www.dell.com.au This quality 27-inch IPS unit has a resolution of 1,920 x 1,080 with an aspect ratio of 16:9.</p>	 <p>[BEST PERFORMANCE] ASUS PG278Q</p> <p>\$999 www.asus.com/au If you're looking for the best PC gaming display right now, there's no better than this 27-inch G-sync monitor.</p>	 <p>[NEW ON SHELF] AOC U2868PQ</p> <p>\$640 www.aocmonitor.com AOC's 28-inch TN panel at 3,840 x 2,160 is the cheapest 4K we've yet tested and great bang for buck.</p>		<div>PC MONITORS</div>
 <p>[BEST BUDGET] Tt eSports Poseidon ZX</p> <p>\$99 au.ttesports.com This basic compact board still has it where it counts, with solid performance and comfortable keys.</p>	 <p>[BEST VALUE] Logitech G710+</p> <p>\$130 www.logitech.com This brown switched mechanical gaming keyboard is comparatively quiet and has great key feel.</p>	 <p>[BEST PREMIUM] Corsair Vengeance K95 RGB</p> <p>\$230 www.corsair.com Available in multiple switch colours, the K95's backlighting can be customised in almost any shade.</p>	 <p>[NEW ON SHELF] Razer BlackWidow Chroma</p> <p>\$210 www.razerzone.com Razer's joined the multi-coloured LED club, upgrading its BlackWidow with rainbow-coloured backlighting.</p>	<div>PC PERIPHERALS</div> <div>GAMING KEYBOARDS</div>	
 <p>[BEST BUDGET] Microsoft LifeChat LX-3000</p> <p>\$35 www.microsoft.com.au/hardware A cheap basic USB headset with noise-cancelling tech.</p>	 <p>[BEST VALUE] SteelSeries Siberia V2</p> <p>\$80 www.steelseries.com Luxurious with great sound and a brilliant retractable microphone.</p>	 <p>[BEST PERFORMANCE] Audio-Technica ATH-AG1</p> <p>\$349 www.audio-technica.com.au A super-comfy headset with massive drivers and fantastic sound.</p>	 <p>[NEW ON SHELF] Kingston HyperX Cloud II</p> <p>\$160 www.kingston.com These affordably-priced cans sound great across games, music and movies.</p>	<div>GAMING HEADSETS</div>	

				
	[BEST BUDGET] Logitech G402 Hyperion Fury	[BEST VALUE] SteelSeries Sensei RAW	[BEST PERFORMANCE] Razer Taipan	[NEW ON SHELF] Logitech G502 Proteus Core
	\$49 www.logitech.com A hybrid-sensor gaming mouse with optical, gyro and accelerometer tracking, this one doesn't skip a beat.	\$70 www.steelseries.com This cut-down version lacks frills, but gets the basics right with great performance.	\$80 au.razerzone.com A super-high-resolution gaming mouse that's actually comfortable to use.	\$80 www.logitech.com This surprisingly affordable new optical mouse from Logitech offers great tunability.
				
	[BEST BUDGET] Brother HL-L2340DW	[BEST VALUE] HP Officejet Pro 6830	[BEST PHOTO PRINTER] Epson Expression XP-720	[NEW ON SHELF] Epson WorkForce Pro WP-4540
	\$110 brother.com.au It's black and white only, but with Wi-Fi and great text print quality alignment, very fast print speeds and cheap to run.	\$180 www.epson.com.au A great all-rounder that's up for both photo-printing and text documents.	\$210 www.epson.com.au Creates fantastic-quality photo prints at a relatively affordable price.	\$449 www.epson.com.au Requires manual print head alignment, but very fast print speeds and cheap to run.
				
	[BEST BUDGET] Sapphire Dual-X Radeon R7 265	[BEST VALUE] ASUS STRIX-R7370-DC20C-2GD5	[BEST PREMIUM] Gigabyte GV-N970WF30C-4GD	[BEST EXTREME] MSI GTX-980-4GD5
	\$190 www.sapphiretech.com This beats the similarly-priced GTX 750 Ti from Nvidia for value and speed.	\$250 www.asus.com/au This mid-range card from AMD can run pretty much anything with all the bells and whistles at 1080p.	\$490 www.gigabyte.com.au If your budget stretches to around \$500, this new GeForce is extremely fast and great value.	\$780 au.msi.com This top-tier card from MSI and Nvidia is super speedy and what we'd select if money is no object.
				
	[BEST BUDGET] ASRock H97M-Anniversary	[BEST VALUE] ASRock Z97M Pro4	[BEST PERFORMANCE] ASUS Z97-A	[NEW ON SHELF] ASUS Z170-AR
	\$99 www.asrock.com Built to go with the Pentium G3258, this is a solid all-rounder for under \$100.	\$145 www.asrock.com This budget Z97 motherboard has all the basics you'll need for an upgrade to the latest Core i5 CPUs.	\$210 www.asus.com/au Has nearly all the things worth caring about in a high-end board and lacks little else.	\$259 www.asus.com/au You'll need a new Z170 board to match the i7-6700K CPU below. This is one of the best all-rounders.
				
	[BEST BUDGET] Intel Pentium G3258	[BEST VALUE] Intel Core i5-4690	[BEST PREMIUM] Intel Core i7-4790K	[NEW ON SHELF] Intel Core i7-6700K
	\$80 www.intel.com An extremely overclockable dual-core CPU for those looking at building a ballsy budget rig.	\$250 www.intel.com This new Core i5 chip offers great performance with low power use.	\$405 www.intel.com If money's no object, buy this unlocked and overclockable super-fast chip.	\$550 www.intel.com The top chip from Intel's new 6th-gen Core i desktops is extremely fast and overclockable.
				
	[BEST BUDGET] Intel SSD 530 Series 120GB	[BEST VALUE] Intel SSD 530 Series 240GB	[BEST PREMIUM] SanDisk Ultra II 480GB	[BEST EXTREME] Samsung 850 EVO 1TB
	\$90 www.intel.com.au A fast, reliable and low-priced SSD. A great option for anyone looking for a budget SSD.	\$150 www.intel.com.au Intel's great reliability and solid performance combine with an excellent price to hit the sweet spot.	\$250 www.sandisk.com This reasonably-priced unit from SanDisk has heaps of space for your OS, games and critical apps.	\$540 www.samsung.com/au This successor to the 840 EVO offers the best mix of speed, capacity and price for those with big needs.

THE
MOST FUN
YOU CAN
HAVE WITH
YOUR HANDS
WITHOUT
GOING
BLIND



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